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QUEENSLAND AGRICULTURAL JOURNAL

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Event and Comment.

The Current Issue.

A scheme for standardising varieties of wheat grown in Queensland and for the propagation, grading, cleaning, and distribution of seed wheat is discussed by Mr. Quodling in this issue. Mr. Cottrell-Dormer has some interesting illustrated notes and observations on the red streak associated with Queensland Top Rot disease in cane. Mr. Edmund Jarvis, who has been in the South on a long and well-earned holiday, and whose contributions to these pages are so well appreciated, has resumed his series of seasonable hints to canegrowers. Inquiries on entomological subjects will welcome Mr. Veitch's suggestions concerning forms of inquiry and the sending of specimens for identification. Mr. Verney supplies some timely notes on milk veins and wells; also the care and handling of cream. Some factors that determine the keeping quality of stored maize are discussed by Mr. Coleman. Mr. Shelton continues his series on sty and paddock accommodation for pigs, and adds some informative notes on the Berkshire. Marketing table poultry is Mr. Rumball's subject this month. Of particular interest to dwellers in forest areas is a descriptive article on the naming of Queensland timber, together with a complete schedule showing botanical identity, and official and local vernacular names of woods, supplied by Mr. Swain. Two interesting plants from North Queensland, illustrated by very fine drawings, the work of Mr. Helmsing, are described briefly by Mr. White and Mr. Francis.

The Department and the Farmer.

The organisation and work of the Agricultural and Stock Department were reviewed by the Under Secretary, Mr. E. Graham, in the course of a radio talk to farmers which was broadcasted from 4QG recently. Mr. Graham pointed out that

departmental success was the result of a broad-visioned policy, allied with administration in sympathy with its peculiar needs, woven inextricably with the fortunes of the agricultural industry. The basic elements of agriculture were land, sunshine, water. Two of those elements Queensland possessed in abundance, and in the provision of the third, where the need existed the full resources of science, were being invoked by far-seeing leaders in the movement for rural improvement. The resources of science, directed by common-sense administration, were also being invoked in the solution of our rural problems—problems that were met with daily in departmental life. Since 1859, when Queensland attained self-government, the development of agriculture had been steady and consistent. From those first beginnings at New Farm, Breakfast Creek, Eagle Farm, and Coorparoo, now embraced in Brisbane suburbs, had grown the great industry as we knew it to-day. At the end of the last census period (1921) 16,249,600 acres in Queensland were peopled by prosperous farmers and dairymen. From the day when Patrick Leslie drove in his tent pegs on the Darling Downs the vast resources of the State had been gradually unfolded. The progress generated by the efforts of a small population had been phenomenal, and it is doubtful if any other country in the world could show the same record.

Anzac.

25th April, Anzac Day, is one of the greatest dates in Australian history, and its reverent commemoration was general throughout the Commonwealth. The men who gave Australia liberty to continue her free development, her place among the nations, and a resplendent example that has already become a great tradition, were not forgotten. In 1914 Australia called for her best; she is calling for her best to-day, and in the work of nation building the best, animated by the spirit of Anzac, will not be denied her.

On the Air.

Radio talks to farmers are becoming a popular feature of the broadcasting programmes of the State Wireless Station. The present series was begun on the occasion of the commencement of operations with the new and powerful plant with an address by the Minister for Agriculture and Stock (Hon. W. Forgan Smith), in the course of which he reviewed the work of the Council of Agriculture, of which he is president, and Queensland agricultural organisation generally. Improvement in production followed, Mr. Smith pointed out, when science guided the way and a similar improvement would result naturally from the application of science to marketing methods. The Government had initiated a sound scheme, had seen it through its teething period, financed it in its early stages, and clothed it with the requisite legislative and executive authority. The provision of food, clothing, and shelter were the immediate material needs of the people, and in the scheme for organising the affairs of the rural producer the interests of the consumer had not been disregarded. The aid was to bring both sections closer together and reduce the economic waste that is the natural corollary to haphazard and disorderly marketing. The main objects of the Council of Agriculture were to extend co-operative marketing of farmers' produce, to encourage the development of the business side of farming to the highest point of efficiency, and create in the mind of the city dweller a truer conception of the farmer's relationship to other units in the social and economic structure. The problem of how to make farming show a reasonable return was, as was quite evident, a national one. In Australia, by general agreement, we protected the secondary industries to ensure reasonable returns and satisfactory progress in those industries. The claim of primary producers to a simalar measure of protection was, on the face of it, just and equitable. Australia called persistently and insistently for a positive policy in every industry and activity. The Australian people were, on their record, quite equal to the task of industrial reorganisation and reconstruction, primary and secondary, on the basis of fairness, soundness, and sanity, and the road to the desired goal was beaconed by co-operation and education. Ignorance cost more than anything else in the world. Education was the one thing for which no nation ever paid too much. To education was to co-operate. The Government had been quick to realise the value of radio as a great social force, and to recognise that no single invention in this age of wonders touched so closely human interest and human welfare.

The Corriedale.

Over 10,000 sheep in Queensland are described as Corriedales on stock returns, and only one flock out of the total is registered by the Corriedale Stud Book. Interest in the breed as a dual purpose sheep is increasing, and too much care cannot be taken in maintaining stud book standards. As to what a Corriedale should be, we are indebted to Mr. J. H. Fairfax, of Marinya, Cambooya, for the following definition:—

(*a*) The foundation stock must be Lincolns and Merinos.

(*b*) The sheep shall be inbred half-breds for at least twenty years.

(*c*) In the event of a breeder starting his flock with pure Corriedales on one side, it would only be necessary for the progeny from the half-bred Lincoln-Merino ewes or rams to be subsequently inbred for fifteen years.

(*d*) Any breeder whose flock has been bred up on both sides from Corriedale flocks fully registered in the New Zealand Sheepbreeders' Association's Flock Book shall be eligible for registration, provided only that such flocks shall have been inbred for a period of at least twenty years.

The Interdependence of Primary and Secondary Industry.

The grouping of our industries as primary and secondary is becoming to be regarded as quite illogical. All industries are interdependent and complementary, and this point was discussed fully at a recent meeting of manufacturers in the South. The views put forward on that occasion are worthy of more than passing notice. It was argued that when we look at the matter closely we see that civilised society would be impossible but for the division of labour. Machine methods and the wonderful inventions of modern times, it was held, have not only increased enormously the productivity of man, but they have so widened his horizon and multiplied his wants as to greatly increase the divisions into which the labour of the community is drafted. Every individual is able to devote his life to the occupation to which choice, chance, or circumstance has called him, only because others are engaged in producing the other things he needs to sustain life and give it colour and movement. Men are able to devote the whole of their time to the growth of wheat, for example, because and only because, other men manufacture machinery, drive trains and lorries, grind wheat into flour, make and deliver bread, and do the hundred and one other things necessary to make possible that measure of comfort modern man demands. And no one of these, it was further argued, is entitled to regard his labour as more necessary than that of his fellows. "The man who is engaged in growing wheat is no more necessary to the production of the loaf on our table than the man who baked it, or the man who built the oven in which it was baked, or the man who built or drove the cart which brought it to our door. In order that the farmer may grow wheat he must have machinery made for him by the despised manufacturer in what is called 'secondary industry.' The production of wheat on the farm is only one stage in a long and complex process which ends in the delivery of bread to the consumer in Australia or on the other side of the world." (We quote from a speech by Mr. W. M. Hughes, former Prime Minister, on the occasion referred to.) It was further held that the man on the land is able to devote himself to producing wheat or wool or butter or fruit, because other men make agricultural or sheep-shearing machinery, wool presses, churns, build factories, drive trains or lorries, and sail ships, to say nothing of making clothes, boots, and the many other things that modern man, whether on the land or in other industries, desires and considers necessary. One manufacturer put it this way: "Which is the primary industry, that of the man who grows the wheat, or that of the man who makes the machinery with which he ploughs, harrows, and garners the wheat?" It was further held that to say that the men who build the separator and the churn are engaged in secondary industries, while the men who use them are primary producers, is to wrest words from their obvious meaning. One is tempted to pursue the interesting conclusions of the speakers at that particular function further, but it is plain to all, looking at the subject from any point of view, that all services are essential, that they depend one upon the other, and national progress depends just as much on urban as on rural industry. A nation must have two legs to stand on—"primary" and "secondary" industry—and in regard to each, Australia must aim to go right ahead to the limit of her resources.

Bureau of Sugar Experiment Stations.

NOTES AND OBSERVATIONS ON THE RED STREAK ASSOCIATED WITH QUEENSLAND TOP ROT DISEASE.

By W. COTTRELL-DORMER.

Introduction.

The experiments and observations outlined below were carried out with a view to inquiring into the nature of certain bright Red Streaks which appear in cane leaves, especially Badila (N.G. 15), at about this time of the year. The whole of the inquiry was carried out during the very short period of three weeks—15th December, 1925, to 6th January, 1926—so that the work had to be done in a more or less hurried fashion, and it is only because it is probable that a considerable period of time must elapse before the present writer can again take up the work that these preliminary notes are being published.

PLATE 119 (Fig. 1).

During the course of this paper the words Red Streak, written with capital letters, refer definitely to the Red Streaks under investigation, and only to such, while red streak written without capitals is to be considered as a collective term referring to any of the many different types of red streaks which accompany cane ailments.

The writer wishes to thank the Rev. N. Michael, who, by giving the use of a room, stove, cupboards, &c., greatly facilitated the execution of the microscope work and culture work necessitated by this inquiry, and Mr. D. S. North, pathologist to the Colonial Sugar Refining Company, Limited, for valuable suggestions.

To Mr. H. Ritchie, of Kilrie Farm, and to his neighbour, Mr. J. Soper, junr., many thanks are also due for permission to carry out the inoculation experiments in their canefields.

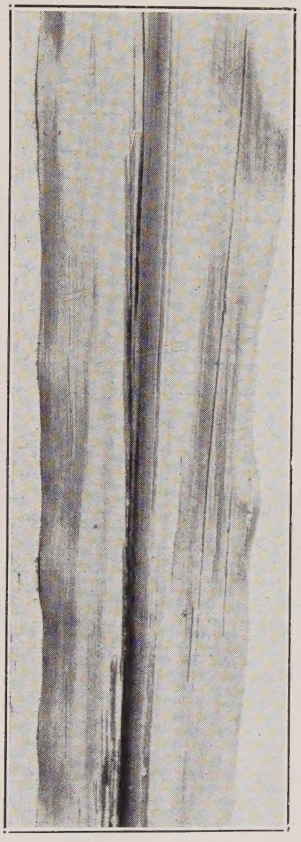
Description of Red Streak Infection.

The first visible indication of Red Streak infection in a cane top is the presence at the base of one or more leaf blades, usually on the half unfurled or first unfurled leaf, of a narrow, dark watery green, longitudinal streak about 1 in. to 1½ in. in length and $\frac{1}{16}$ in. in width. This streak grows very quickly, and as it grows alters in

colour, gradually changing from watery green to watery brown and then to bright blood red. Fresh streaks are meanwhile formed on the same and younger leaves, and unless some climatic or other factor which is not yet understood intervenes the infection apparently progresses until all of the younger leaves are blazoned with brilliant red lines, which will sometimes coalesce if two or more streaks be close together, forming bands often ½ in. or more in width and 2 ft. or 3 ft. in length. (See Fig. 1.) On the other hand, the infection will sometimes cease to be active after one thin streak, perhaps no more than 1 in. in length, has been formed.

Red Streaks are able to form in any portion of the leaf (see Fig. 2), though it is the general rule for them to take their source at or near the base of the blade; they are often found on the under side of the mid-rib, and these are the ones that usually attain the greatest length.

When the Red Streaks become old the tissue which originally formed them will sometimes die and wither, and assume a chocolate-brown colour.



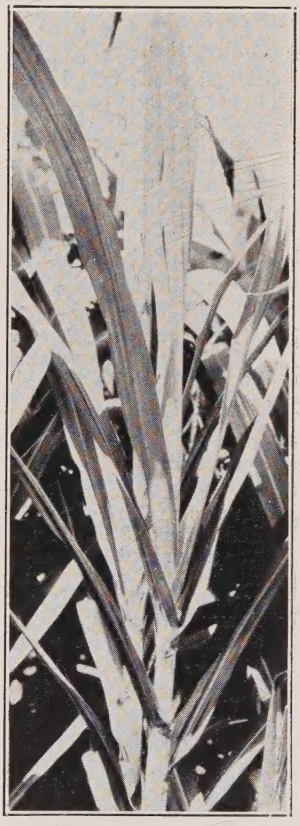


PLATE 120 (Fig. 2 and 3).

A very noticeable feature of the most active Red Streaks is that they are almost invariably splashed here and there along their whole length by brown or white stains which appear to be the result of the drying of some exudation formed during their growth, though no wounds of any kind are visible at these places, unless the leaf tissue has broken down completely, as sometimes does happen.

Observations on Growth of Red Streak.

With a view to observing the growth of Red Streaks three stems were selected, marked, and examined from time to time. Observations were commenced at 12 noon on 19th December, when stem

A had one sharp narrow Red Streak 6 in. long, and commencing about 1½ in. from leaf-sheath juncture on third fully unfurled leaf.

B had one 2½ in. streak of a watery green colour tinged here and there with pink on half unfurled leaf.

C, which was part of a badly Red Streak infected stool, one stalk having already been killed by Top Rot, was marked by one streak 9 in. long, bright red, and starting from near leaf-sheath juncture.

21st December—

A Streak unaltered.

B Streak was now 12 in. long, bright red at base, and very dark watery green to watery brown spotted with red on upper half, and had a vague yellowish tip and background.

C Original streak unaltered. Four fresh streaks about 2 in. in length had formed immediately adjacent to the older streak and with their bases at the leaf-sheath juncture; their colour varied from bright red to watery brown.

23rd December—

A No alteration.

B Original streak now 18 in. long and all dark red, with withered portions in upper part. Fresh watery green to brown streak 4 in. long now present immediately to right of above. The second leaf above the originally infected leaf—i.e., what was now the first fully unfurled leaf—now showed a patch about 1 in. long by ⅛ in. wide about ½ in. above the leaf-sheath juncture. Central portion of this patch was of a light brown colour, while edges were a light pink. This patch apparently represented a severe local infection.

C Streaks all dark red, otherwise no alteration.

26th December—

A No alteration.

B A fresh young streak about 2 in. long was now forming on leaf situated between two leaves already infected, while the patch referred to above had become part of a wide vigorous looking streak 4 in. in length.

C No alteration.

4th January—

A No alteration.

B Position of infected leaves was now 3rd, 4th, and 5th, fully unfurled. Streaks on 5th (original infected leaf) had coalesced to form a large dark Red Streak 18 in. long, with dead central tissue in places. Streak on 4th was now about 8 inches long and all dark red. Third leaf was still showing signs of activity, as two watery brown streaks each about 2 in. long were forming at base of leaf. Most of patch noticed on this leaf on 23rd December was now quite dead and largely disrupted, while the streak emanating therefrom was now some 10 in. long and marked every here and there by a brown or white "exudation stain."

C No alteration.

Distribution of Red Streaks in a Field.

Some counts were taken in the field where the above observations were made of three rows, each ten rows apart, in the worst infected end of the field. Thus—

Row.	Total Number Stools.	Percentage of Diseased Stools.	Total Number Stems in Diseased Stools.	Percentage of Diseased Stems.
1	191	30·0	270	38
2	287	19·5	302	43
3	290	5·5	89	21

Further counts taken a week later showed but very slight increase in the incidence of the Red Streaks, though, judging by appearances, the number of Red Streaks had increased very much.

Though single infected stools were met with here and there, it was very noticeable that most of the diseased stools in each row were confined to four or five well-defined centres of infection.

Most of the infected stools were situated in the north-eastern corner of this field, where the cane was showing the best and most vigorous growth.

However, Red Streaks are not necessarily always confined to the most vigorous cane, or even to young plant cane. The writer has seen a field of young plant Badila at Stratford, near Cairns, very seriously infected with Red Streaks, though the cane was very backward indeed, and growing on badly-drained, sour-smelling land. On the Burdekin River Red Streaks were observed on this visit on the leaves of fully-matured Badila, while on the Herbert River late in November Red Streaks were seen on young ratoon shoots 18 in. high of Badila and Q. 813. Vigorous young plant Badila, however, is the cane usually attacked.

Relationship of Red Streaks to Top Rot Disease.

A field which is well infected with Red Streaks usually gives off a strong smell of decaying fruit, and upon close examination it is seen that every here and there a stalk whose top is literally covered in Red Streaks has a dead "heart," which may be easily pulled out (see Fig. 1), its lower end being quite rotted, and which has an offensive

PLATE 121 (Fig. 4).

odour. On the other hand, some tops are found whose hearts are dead but whose leaves are not marked by Red Streaks; however, when the heart is pulled out it is found that some of the very young leaves, now dead, are marked, at a region usually about their middle, by a peculiar streaky discoloured area distinctive in the very irregularity of its form; such areas do not generally cover more than about 3 square inches, usually much less. Both of these conditions constitute what is known as Top Rot.

During this inquiry it was observed that fully 90 per cent. of the stalks whose hearts had been killed by Top Rot had one or more leaves marked by one or more Red Streaks.

Questioned on the matter of relationship of Red Streaks to Top Rot, some twenty farmers were adamant in the expressed opinion that Red Streaks were the early stage of Top Rot, and that fields which later suffered heavily from Top Rot always showed a heavy infestation of Red Streaks before the real damage was done, though the fact that Red Streaks were present did not always signify that Top Rot would be severe later on—i.e., that cane often appeared to be able to recover from a severe visitation of Red Streaks and show but very little loss from Top Rot.

H. Tryon (1), in his paper on Top Rot Disease, refers to Red Streaks in four places (pp. 8, 22, and 41), and in one place at least (p. 22), where one grower is quoted as having remarked:—"Yes, I was amongst this cane with Red Streaks in its leaves five weeks since, and was then able by the odour that it emitted to recognise the presence of Top Rot." It seems that the Red Streaks described above are being referred to.

More recently the writer (2) has referred to Red Streaks as being the early stage of Top Rot, basing his opinions on field observations.

That there is some intimate relationship between Red Streaks and Top Rot is obvious since the former seem to invariably precede and accompany the latter in the field, though not necessarily in the stalk.

Similar Diseases in Other Countries.

In Hawaii a disease occurs which is known as Bacterial Red Stripe Disease, and bears many characteristics similar to those of Top Rot as it is known in Queensland. H. Atherton Lee and W. C. Jennings (3) state that this disease "is easily identified by the long, narrow, dark red, longitudinal streaks on the cane leaves. These streaks usually start midway between the tip of the leaf and its juncture with the leaf sheath, at the point where the bend in the leaves of Tip Canes takes place. The first indication of the disease is a watery darkened streak, not yet red, but still green, which spreads longitudinally up and down the leaf. This watery, dark green streak gradually becomes bright red in colour."

Polvillo is a bacterial disease which occurs in Tucuman, Argentine, and has been carefully studied by G. L. Fawcett (4). The description of this disease very much resembles that of Top Rot. As in the case of the latter disease red stripes and dead hearts are produced. Plant cane chiefly is attacked.

D. S. North (5) points out the similarity between Top Rot, Red Stripe, and Polvillo, in the following words:—"Conspicuous red streaks are the most characteristic symptoms with all three diseases. Those of Red Stripe usually start about the middle of the leaf blade, and are long, whereas those of Top Rot are shorter, and are usually confined to the base of the leaf blade, although in other respects much the same. Reddening of the leaf-sheath occurs regularly with both Polvillo (the Argentine disease) and Top Rot, but only in severe cases with Red Stripe. All three cause a Top Rot in severe cases. Cuttings from diseased stalks do not usually produce diseased plants. When Top Rot occurs side shoots of healthy appearance may sprout from below the rotten portion and grow without further sign of the disease." Referring to Red Stripe disease the same author goes on to say that—"In these and all other respects the resemblance is so striking that we may now suspect our Top Rot to be due to a similar cause, viz., bacteria, which are probably disseminated by the wind and flying insects, and which need rainy weather in order to infect the leaves. Frequently the disease is confined to the leaves thus affected, and disappears when these leaves wither, unless younger leaves become similarly infected in the meantime. Even in severe cases where Top Rot results from the invasion of the apical bud and top generally, the disease runs a rapid course and disappears with a change to weather conditions unfavourable to it, leaving the top dead but the rest of the stalk free from infection."

It was especial consideration of the paper just quoted which led the writer to investigate the matter in the field on this occasion.

Before going further the writer would like to mention that in his experience the leaf-sheaths of Red Streak infected cane have not become reddened under field conditions except in fairly severe cases.

Were Red Streaks and Top Rot proved to be infectious bacterial diseases, a moment's consideration would show us what ideal conditions obtain at the season of Red Streak appearance for the transmission and incubation of the responsible organism. The water of transpiration always present on cane tops during the season when the disease is prevalent provides a suitable channel of infection and incubation if such are needed, and, again, the under side of the base of the blades of young cane leaves is the favourite feeding ground of certain sap-sucking Homoptera, such as *Perkinsiella saccharicida*, which also makes large punctures in the mid-rib when laying its eggs.

Bacteria Found in Red Streaks Associated with Queensland Top Rot.

Late in November last the writer examined Red Streaks from young ratoon Badila and Q. 813 at Macnade, Herbert River, and found many active bacteria in all of them, but especially in those streaks which had reached about the half-way stage in the transition from watery green to red.

Red Streaks examined by the writer at Ayr on 16th December were similarly found to contain many active bacteria.

Reproduction of Red Streaks by Artificial Inoculation.

Series I.

16th December.—A typical young streak, i.e., one transforming from watery green to red, was suitably cleaned and a portion crushed up in sterilised water. The suspension so formed was used for inoculating sterilised potato slices. In twenty-four to thirty hours a thick, viscid, creamy yellow growth had formed. Lack of bacteriological equipment prevented the preparation of cultures aiming at the isolation of the organism in pure culture.

Plate 122 (Fig. 5).

19th December.—After three days' growth on a potato slice a suspension of the bacteria was made in sterilised water and used for inoculating the leaves of fifteen stalks of Badila (N.G. 15) in a field of vigorously growing eight months old irrigated plant cane showing no definite Red Streaks. The suspension contained actively motile bacteria of similar appearance to those seen in Red Streaks previously.

The methods of inoculation included inoculation with and without punctures and with a protective covering, inoculations a few inches up one or two leaves of individual stalks, and inoculation at the base of the heart. Punctures were made with a sterilised pricker, and covering was effected by placing a little damp cotton wool on each side of inoculated region and wrapping the two or more inoculated leaves and those adjoining with thin waxed paper.

Development of Red Streaks in Inoculated Leaves.

Within seven days 100 per cent. of punctured leaves and 75 per cent., i.e., 3, of stalks inoculated without wounding showed positive infection of Red Streaks.

All wrappings were removed on the second day, when it was found that in most cases the cotton wool was still damp. A short, watery green streak had now formed near the base of a half-unfurled leaf on one stalk, while in most other cases it was observed that the punctures, where visible, were surrounded by a light red margin.

On the fourth day nine stems, including one which had been inoculated by simply placing a drop of suspension on the under side of the half-unfurled leaf and on the upper side of the leaf immediately below it, and two in which inoculation had consisted of pouring a little suspension on to the base of the heart, showed one or more watery green to light yellow streaks on their leaves. Even where the needle had been used it was observed that not all of these streaks arose from punctures, as in some cases streaks had developed in regions of the leaf unwounded throughout their length. Many of the older streaks, i.e., those streaks which were already approaching a red colour, were marked by one or more of the "exudation stains" described earlier. Five other stems were now developing watery green streaks about punctures.

On the fifth day three stems showed positive infection with Red Streaks. In all cases the infection was developing rapidly. Fresh "exudation stains" were seen to have formed.

On the sixteenth day it was found that the infection had been so vigorous that many leaves bore Red Streaks 1 ft. to 3 ft. in length, and in some cases fresh watery green streaks were still forming on the green leaves of heart. In few cases had the infection travelled below the leaf-sheath junctures.

SERIES II.

19th December.—The leaves of eight stalks near those treated in Series I. were similarly inoculated as controls, using as inoculum a brick-red bacterial colony which had developed on a control potato slice through contamination.

Red Streaks were sparsely produced on five of these stalks, however, being possibly attributable to a carry-over of bacteria from the earlier inoculations in spite of the aseptic precautions taken.

SERIES III.

This series of inoculations was carried out at the least infected end of the field where the infection counts mentioned earlier were taken in well-watered, vigorously growing, eight months old Badila. Very few stalks showed Red Streaks in the vicinity of those inoculated.

21st December.—Ten stalks were inoculated direct from infected leaves taken from the field itself by drawing a needle through a vigorous watery brown streak and then scratching the half-unfurled leaf and that immediately below it at about 4 in. from the leaf-sheath junctures.

Twenty stalks were inoculated as in Series I., using a pricker and a suspension made from a five days old culture.

Of these thirty stalks 100 per cent. developed positive Red Streak infection, the most vigorous infection being obtained where the base of the young leaves of the heart had been inoculated with the suspension and the least vigorous where Red Streaks themselves had been used as inoculum, which possibly may be explained by the comparatively dry nature of the latter.

SERIES IV.

As it was desirable to find out what effect the bacteria would have on the immature tissues of the cane top, a hypodermic syringe fitted with new needle and washers was employed in this series of inoculations. Previous to using for this purpose the syringe had been employed by a dentist for cocaine injections. The syringe was now washed out with methylated spirit and then with distilled water, this being again done after this series of inoculations was completed.

23rd December.—Fresh suspensions of bacteria were made up from seven days old cultures, which were now old and evil-smelling.

Charges of from ·5 c.c. to 1·5 c.c. of suspension were forced into various parts of the cane tops, from the uppermost ligule down to the semi-mature cane stem.

This series of inoculations produced no effect whatever on leaves, heart, leaf-sheaths, or stem. It was therefore concluded that either the syringe still contained fragments of some powerful sterilising agent after washing, or the cultures had become sterile through the action of their own excretions, which is the more likely explanation since the syringe was so often emptied and refilled. Microscopic examination of the suspension used had, through an oversight, been omitted.

Reproduction of Top Rot Symptoms by Artificial Inoculation.

Series V.

29th December.—As soon as it was seen that Series IV. had failed to produce any infections, fresh potato-slice cultures were prepared from a vigorous young streak taken from an infected stem in Series I., one control slice being also prepared. Whereas the latter remained free from bacterial growth throughout the period of observation, the former already showed slight viscid, creamy yellow growth after ten hours, and in thirty six hours sufficient bacterial matter was available for further inoculations; a suspension of this matter was accordingly made in sterilised water, and was found to contain many actively motile bacteria similar in appearance to those previously observed.

30th December.—Twelve stalks in the field mentioned under Series I. were each injected with 1·5 c.c. of the fresh suspension. These inoculations were divided into three groups as follows:—(*a*) Suspension injected 1 in. below uppermost ligule; (*b*) suspension injected 3 in. below uppermost ligule; (*c*) suspension injected 6 in. below uppermost ligule. This grouping really includes quite a variety of inoculation points since some stems were unavoidably further advanced than others.

Plate 123 (Fig. 6).

The leaves of ten other stalks were inoculated as in Series I. In four of these inoculations the suspension was first passed through the hypodermic syringe. The leaves of six of the stalks in this group were punctured at time of inoculation, while the remainder were inoculated without wounding.

6th January—

Group (*a*). All showed definite Red Streak infection, many young streaks developing. In one case long light pink and watery marks showed that the infection was descending one young internal white leaf and approaching the growing point of the cane stem.

Groups (*b*) and (*c*).—In these stalks all of the internal and some of the external symptoms of Top Rot were produced. The actual symptoms produced in any individual stalk appeared to depend upon the point of injection. Thus where the heart had been inoculated near the growing point of stem the central heart leaves had rotted through; where the growing point itself had received the injection, or part of it, the usual deformities of nodes and internodes (produced since time of inoculation), the reddening of vascular bundles, and reddening and decay of leaf-sheath bases and adjoining stem tissues attendant on a severe attack of Top Rot, were produced; in all cases, regardless of where the suspension had been injected, a most virulent infection which gave off a typical Top Rot odour resulted, and one or more other minor Top Rot symptoms appeared. Unfortunately, the writer was not able to continue his inquiries further, but since the infections all appeared to be so vigorous on this last day of examination it seemed most probable that death of the heart and growing point, and possibly of the stem itself, would have been the final result of the inoculations. No Red Streaks appeared on the leaves of any of the stalks of these two groups.

Summary of Inoculation Results.

The inoculation experiments described above have shown—

1. That the formation of Red Streaks can be induced in cane leaves by pricking or scratching the epidermis of either side of the leaf near the base of the blade with a needle which has been drawn through an active Red Streak on a naturally infected leaf.

2. That the formation of Red Streaks can be induced in cane leaves by inoculation of the leaves at or near their base with a watery suspension of bacteria taken from a potato-slice culture of the bacteria found in the natural Red Streaks of the field.

3. That the formation of Red Streaks can again be induced by the inoculation of cane leaves with a watery suspension of bacteria taken from a potato-slice culture of the bacteria found in Red Streaks already induced by inoculation with the suspension mentioned under 2.

4. That the formation of Red Streaks can be induced by placing at the base of the young cane leaves a little of either of the suspensions mentioned under 2 and 3 without bruising or in any way wounding these leaves.

5. That the formation of all of the symptoms of Top Rot can be induced by inoculation on the immature tissues of cane stem and leaves with a watery suspension of bacteria taken from a potato-slice culture of the bacteria found in Red Streaks induced by inoculation of leaf with suspension mentioned under 2.

References.

1. Tryon, Henry. "Top Rot of the Sugar Cane." Queensland, Bureau of Sugar Experiment Stations, Div. of Pathology, Bul. 1, 1923.

2. Cottrell-Dormer, W., in Twenty-fifth Annual Report of the Bureau of Sugar Experiment Stations, Brisbane. December, 1925. Page 25.

3. Atherton Lee, H., and Jennings, W. C. "Bacterial Red Stripe Disease of Top Canes." Cir. No. 42. Exper. Stat., H.S.P.A, Honolulu, Hawaii, April, 1924.

4. Fawcett, G. L "Enfermedades de la Caña de Azúcar en Tucuman. Rev. Industry Agric. de Tucuman; Vol. 23, 1-2, 1922.

5. North, D. S., in an unpublished report on a visit to Hawaii. Sydney, 1924.

Illustrations.

1. A young stem with heart killed by Top Rot and leaves showing many Red Streaks.
2. Portion of a matured leaf about 10 in. above leaf sheath, showing Red Streaks which have developed well up on leaf blade and on midrib.
3. A typical Red Streak infected stem.
4. A glimpse into a badly Red Streak infected field.
5. Stem No. 20 of Series I. of inoculation, showing Red Streaks at base of young leaves.
6. A closer view of stem No. 20, with one leaf removed to show Red Streaks. A young watery brown streak is seen forming on leaf marked X.

ENTOMOLOGICAL HINTS TO CANEGROWERS.

By EDMUND JARVIS, Entomologist.

Fighting the Giant Termite.

Growers on the Burdekin should be careful, when planting, to see that cane used for this purpose does not harbour white ants.

Preventive methods of a common-sense nature must not be neglected. Endeavour, therefore, to locate any invasion of this termite in canefields, which can sometimes be traced to infested roots, old tree stumps, &c., either situated in the field or on land adjoining same. Burn all affected logs, fencing posts, or timber located on or close to headlands. Continue to use the arsenical poison-bait claimed by Mr. J. C. L. Kamp to be effective against this pest. Infestations occurring in the field far away from headlands should be combated by fumigation of the soil with carbon bisulphide or other suitable fumigants.

PLATE 124.—WHITE-ANTS (*Mastotermes darwiniensis*) FROGG. (NATURAL SIZE), INSIDE A STICK OF SUGAR-CANE.

How to Deal with Weevil Borers.

To discover the presence of this cane-borer in fields thought to be affected, it is a good plan to place a number of bait-traps on headlands and among the cane rows. These consist merely of pieces of split cane about eighteen inches long, placed in little heaps of from ten to twenty pieces, and covered over very lightly with trash to exclude sunlight and prevent the sticks from drying too quickly. Visit and examine these traps every second day, and if weevils be found in them among the split pieces, advise the Entomologist at Meringa without delay.

Tachinid parasites of this beetle-borer will be released by the Sugar Bureau free of cost on such infected areas, on condition the grower will agree to leave about a-quarter of an acre of such cane uncut for the flies to breed in. This should be allowed to stand for about three months, and during that time must not be burnt.

Learn to Recognise your Insect Friends.

Do not destroy soil-frequenting larvæ, &c., of beneficial insects that are parasitic or predaceous on grubs injuring your cane, and are often brought to the surface when ploughing.

Some of the commonest of these are figured and described in my Entomological Hints for March, 1925 (see "Queensland Agricultural Journal," vol. xxiii., pp. 273, 274; and "Australian Sugar Journal," vol. xvi., p. 831). Insectivorous birds should be carefully protected, and any cases of ruthless destruction of same brought under notice of the authorities. Our chief grub destroyers are the Straw-necked Ibis, White Ibis, Magpie Lark (known also as Pewee or Mud Lark), Laughing Jackass, Crow, and Swamp Pheasant. All the above, with exception of the Crow, are absolutely protected throughout Queensland. The penalty for wilfully killing, or capturing by whatever means, any of these birds is a fine of not less than one pound nor more than five pounds.

Collecting the Grubs.

Economic entomologists the world over have long recognised the advantage obtained from systematically collecting the grubs of many injurious species of root-eating scarabæidæ. In an official bulletin issued by one of the Sugar Experiment Stations at Porto Rico a few years ago, we read:—"The most successful method of controlling the 'white grub' that has yet been found, is that of collecting the grubs and beetles. The method is rather expensive, but it is the only way of keeping the pest from increasing." The fact that during the last two or three years other artificial control measures for cane-grubs have given more or less promising results should not induce us to abandon this common-sense method, which is still being advocated in other sugar-growing countries.

CONTROL OF CANE DISEASES.

The Director of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) has received the following report (19th April, 1926) from the Assistant to Pathologist, Mr. N. L. Kelly:—

One of the most important problems confronting the canegrower to-day is the *control of diseases.* In the Nambour district, Gumming and Mosaic are the most troublesome. Fiji disease, and to a smaller extent mosaic and gumming, are causing considerable losses to the Beenleigh growers.

Gumming Disease.—The main features of gumming, the losses it causes, its distribution, symptoms, etiology, probable means of infection, and control have been dealt with in a previous report.

There are three broad control measures for all the major cane diseases:—(1) The eradication of infected fields; (2) the careful selection of seed; (3) the use of resistant varieties.

In any district in which gumming is widespread, the first measure becomes impracticable, because of its great cost. The third measure will assume great importance in the Nambour district. The varieties that are resistant or tolerant to gumming are—Q. 813, Malabar, N.G. 16, and H.Q. 285, roughly in that order. Varieties that may be planted along the fringes of gum-infected fields to test their powers of resistance are Q. 970, Q. 1098, H. 227, and probably Q. 855 and Black Innis. Those varieties to be discouraged, at present, are N.G. 15, D. 1135, E.K. varieties, M. 1900 Seedling, Gingila and Innis 131, also Gingor and 7 R. 428.

The second measure—the careful selection of seed—is very difficult to practise, except when the leaf symptoms, the yellow streaks, are showing—usually between two and eight weeks after good growing conditions, and when the cane is more than a quarter of a mile from diseased stools. When situate within this radius it cannot be *guaranteed free of gumming.* Hence the growers of the Nambour district have wisely decided, or practically decided, in favour of the establishment of an isolated experimental farm, in which new varieties can be tested, and from which seed, guaranteed clean, of the varieties desired can be obtained.

A privately-owned farm of 12 acres at Kureelpa, situate about half a mile from the nearest cane, is now being planted with clean seed of desirable varieties. Q. 813 and Malabar the farmers may safely obtain from one another, but any other varieties they desire they should obtain from this experiment farm or nursery one year before the planting in, say, one-twentieth the quantity. Any farm, to supply all the seed planted in any one year, would need to be about 200 acres instead of 12 acres, hence the necessity for one year's propagation beforehand. To minimise infection from other cane, the special seed should be planted in the farms as far from infected or any cane as possible. The cane, after one year's growth, will often be free of disease, but, in unfavourable seasons, may be lightly infected. If the growing of third and fourth, &c., ratoon crops be discontinued, and fields that are infected to a greater extent than, say, 5 per cent. be ploughed out on harvesting, there is little doubt that the general prosperity of the district will be increased, and that gumming, and, of course, mosaic, will shortly be eradicated.

Fiji Disease is present in the Beenleigh district (Q.) and on the Tweed, Richmond, and Clarence Rivers (N.S.W.). The losses it causes in susceptible varieties are enormous. In each infected stool the loss for plant cane is variable and large; for ratoon cane it is often 100 per cent.

Symptoms.—A stool on contracting the disease becomes retarded in general growth. The leaves become shortened and distorted, and later, under the leaves are formed curious galls, more or less cylindrical in shape, and elongated along the veins, and may be from one-fourth to one inch in length. They vary in colour from light green when young to dark brown at maturity. The presence of these galls is the critical symptom of the disease, though a plant may be infected for six months before showing them. At this stage the leaves become noticeably deeper in colour and more distorted, and the cane top frequently has a fan-shaped appearance. Moreover, galls of a yellowish colour are to be found on the vascular bundles of the stem by cutting it open.

The cause of the disease is not known.

It is distributed in diseased sets, but is also very infectious, though the means of infection are not known with certainty. According to one investigator, the soil may carry the infection for a time.

Control.—1. All fields more than 5 per cent. infected should be ploughed out on harvesting.

2. Avoid cutting seed from infected fields, especially on rich soil, as there the symptoms are less obvious.

3. Eliminate susceptible varieties as soon as possible. D. 1135 and Malabar are much damaged by Fiji disease. Q. 813 is, so far as is known, fairly resistant. H.Q. 285 is worthy of a "disease resistance" trial. Of standover canes, N.G. 16 is resistant. N.G. 15 is also resistant, but its susceptibility to gumming makes it unsafe for the Beenleigh district.

CANE CROP PROSPECTS.

The Director of Sugar Experiment Stations (Mr. H. T. Easterby) on his return from an inspection of Southern cane areas stated that although a marked improvement had taken place, due to the recent rains, the cane is still very backward owing to the dry conditions of February and March. The crops at Gin Gin are the most behindhand and at best it is only anticipated that half a crop will be harvested.

The best cane seen was at the Elliott, near Bundaberg, parts of Mount Bauple, and at Coolum and Maroochy River, Nambour. On the whole the Mount Bauple cane is most generally forward, and it has less cane pests and diseases than many other Southern areas.

In order to endeavour to provide gum-free plants in the Nambour area, the farmers are proposing to establish an isolation farm at Kureelpa, on the range, for the purpose of growing resistant varieties. This, if carefully carried out, should be of much value, and the Nambour growers deserve commendation for their action in this matter.

Extensive alterations are being made at the Moreton Mill, Nambour, and the building has been reconstructed to provide for additional machinery. Three new 6 foot mills by 35 inches are being installed, manufactured by Duncan Stewart, together with a new shredder. Ten thousand square feet of additional heating surface are being provided, and a new large Calandria pan 11 feet in diameter. An extra four crystallisers and eight more centrifugals are also being erected, as well as a new Thompson multitubular boiler. The whole of the factory has been remodelled, and the yards outside rearranged and enlarged, while 300 new cane trucks have been provided. These alterations will amply ensure that all the cane grown during the next few years will be treated without difficulty, and there will be no need for the mill to start before the cane is at its best. The estimated cost of the new plant is about £110,000.

CANE PEST COMBAT AND CONTROL.

The Director of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) has received the following report (27th April, 1926) from the Entomologist at Meringa, Mr. E. Jarvis:—

Notes on Calcium Cyanide.

Experiments with this fumigant (cyanogas) against our cane-grubs *Lepidoderma albohirtum* Waterh. and *Lepidiota frenchi* Blackb. were first conducted by the Bureau of Sugar Experiment Stations at Meringa during 1924; when we found that 8 grains of calcium cyanide flakes would kill first-stage grubs of *albohirtum* and third-stage grubs of *frenchi* in less than twelve hours (see Bulletin No. 19, Div. of Entomology, p. 37).

Owing to encouraging results having been obtained from the above initial experiments interest was awakened in other quarters, and experiment plots treated with this fumigant were afterwards laid down, during the present season (1926), by the Colonial Sugar Refining Company, at Greenhills, in the Cairns district.

Our first field tests were carried out at Meringa during May and June, 1924, in order to determine the action of cyanogas on young roots of plant cane about twelve inches high; when we found that doses varying from 100 to 200 grains of the flaked form per stool did not injure the plants if placed 6 inches deep (about level with the sets). Bulletin No. 19, pp. 37, 49.

Early in February, 1925, preliminary field experiments at Meringa resulted in our securing a mortality of about 48 per cent. of first and second stage grubs of *albohirtum* on light volcanic soil, with doses of one scruple, injected (not drilled in) 1 foot apart on both sides of the cane stools. During the present season, 1926, we established two experiment plots last February at Meringa, preliminary results from which were reported last month by the Assistant Entomologist, Mr. A. N. Burns.

Although more adapted for treating terrestrial insects, for the fumigation of enclosed spaces, or destruction of burrowing animals, cyanogas may in the future prove serviceable also against grubs of our scarabæidæ or other subterranean insects.

Owing to its poisonous qualities it should be handled with caution by field workers, as hydrocyanic-acid gas is very deadly to animal life. As previously pointed out (Bulletin No. 19, p. 21) cyanogas flakes are more convenient to handle, and may prove to be better suited for grub fumigation than the powdered or granulated forms. It has been demonstrated that when the relative humidity of the atmosphere is about 50 per cent. or over, most of the gas is evolved during the first two and a-half hours following exposure of the chemical. This gas has been in use for the past thirty-five years or longer to destroy various Coccidæ (scale-insects) attacking fruit trees. It is easily manufactured by pouring sulphuric acid upon pieces of potassium cyanide or sodium cyanide, the poisonous fumes generated being confined in a suitable fumigating-tent which is placed over the tree infested by these insects. Hydrocyanic-acid, however, has a great affinity for water, so that best results against such subterranean insects as cane-grubs, termites, wire-worms, &c., are not likely to be obtained unless the soil be in fairly dry condition at the time of treatment.

A very moist soil will absorb quite an appreciable amount of the gas, thereby materially affecting the percentage of grub mortality hoped for from application of minimum doses. Under such adverse conditions decomposition of the calcium cyanide results principally in the formation of ammonia.

Another factor deserving consideration is that of soil porosity, attention to which in the present instance is of more importance even than when fumigating land with carbon bisulphide.

In well-drained fields the desired degree of moisture usually obtains, and after heavy rain such soils—unless, of course, too loose or too compact—soon become sufficiently aerated to permit free passage of vapour to the full depth of cultivation.

Regarding the effect exercised by cyanogas on soil bacteria, this phase of the question will need to be studied. At present, insufficiency of data precludes expression of definite opinion one way or the other. In the case of paradichlor., however, evidence obtained from an Experiment Plot at Highleigh in 1924, where grubs were not present on either the treated or control areas, showed that where paradichlor. had been applied growth of the cane was more vigorous, the stalks being noticeably longer when harvested; inclining one to think that injurious soil bacteria had perhaps been destroyed, in much the same way as happens after fumigation of cane-land with carbon bisulphide (see Bulletin No. 19, p. 42).

The Advance of Paradichlor.

Canegrowers would do well not to lose sight of the fact that paradichlor. is still holding first place among the various insecticides employed against soil-frequenting larvæ, &c., being at present used extensively both in Europe and America for controlling the ravages of subterranean and other economic insects.

In a scientific contribution by Vayssiere, published last year in Paris, we read:—"The value of paradichlorobenzene as an insecticide has been proved, and its importance is increasing rapidly." Some idea of the growing demand for this fumigant may be gathered from the fact that in the State of Georgia during 1921, 250,000 lb. weight of paradichlor. was used against a single insect-pest, *Aegeria exitiosa*, the grub of which tunnels roots of peach trees. A couple of years later, however (1923), twice that amount (viz., 223 tons) of paradichlor. was employed to combat its activities in the south-eastern portion of Georgia alone. "No tree injury," it is stated, "resulted from the use of the various doses around three, four, and five-year old peach trees in Georgia during 1921 and 1922, when normal weather conditions prevailed." This has also been the experience of growers in California and other States, no injury to root stocks having resulted from such applications. During 1922, reports from Missouri mention that "in nearly every case, the use of paradichlorbenzene against the Peach Borer showed a mortality of 100 per cent." In view of such world-wide demand one cannot wonder at the recent high prices asked for this fumigant.

Its cost, however, has already come down during the past eighteen months to about £4 per cwt., and it is probable that increased manufacture—which must follow as a matter of course—will cause the price of paradichlor. to gradually drop still lower, until reaching the vicinity of £50 per ton.

It is regrettable to note that while growers in other nations are evidently grasping with enthusiasm the opportunity which has at last been afforded them by paradichlor. for preventing huge financial losses due to the activities of certain hitherto uncontrollable insect pests, most of the cane farmers in our own country have quite failed to realise the economic significance of positive results obtained with this fumigant against our cane-grubs by the Bureau of Sugar Experiment Stations during the last three years.

The Large Cane Termite.

Recent experimentation against this pest during the last couple of years has shown that simple methods, such as poison baits applied to infested stumps, roots, posts, &c., digging out the nests and killing the queens; burning old logs and trees situated on or in the immediate vicinity of headlands, should not be neglected. Judging by preliminary results obtained by us on an Experiment Plot this season, benefit is likely to result from the practice of dipping the ends of sets before planting in dehydrated tar. This preventive method has recently been found effective in India (Calcutta, 1921-1924) against termites in sugar cane seed beds, and is certainly deserving of further investigation in the field. Arrangements are being made by us for carrying out additional experiments against *Mastotermes darwiniensis* about the end of the present month (April) in the Burdekin district.

Mr. R. Mungomery, Assistant Entomologist, reports (20th April, 1926):—

Most of the Southern districts have suffered severely from the failure of the usual monsoonal rains to materialise and the consequent drought conditions that have supervened, but happily for growers in the Maryborough, Pialba, Yerra, and Mount Bauple areas, insect damage in sugar-cane is probably the lightest of any of the sugar-producing districts of Queensland, and as conditions are somewhat similar in each of the above-mentioned places I propose to group them together and discuss each insect separately.

WIREWORMS.

These insects are to be met with chiefly on the low-lying paspalum lands around Urraween and Nikenbah in the Pialba district, where they are spoken of as "wireworms" and "grubs," and growers mostly have very different ideas concerning them, so a short description of them and their habits may be of some information to those who, up to the present, have failed to recognise their attack. "Wireworms" are the larvæ of the Elateridae (Click beetles), a large family of beetles of world-wide distribution, and I would respectfully commend this name for general use in preference to the word "grubs," which, as generally used by the layman, is very indefinite and may lead to confusion with the term "white grubs" or larvæ of the Scarabaeidæ (Cockchafers).

Wireworms vary greatly in their size, as also in their habits, but the one under consideration is elongate, 1 to 1¼ in. in length, cylindrical, tough-skinned, shining, yellowish, with its body segments very much alike. The head which, together with the last segment, is of a darker brownish colour, is flat and hard and armed with powerful mandibles, and if the insect be held in the hand it is able to bury these mandibles into the skin and cause a decided pinch. The parent beetles are known as Click-beetles or Skip-jacks, because when lying on their backs they will suddenly click, jump upwards, and land again, having turned over right side up. They are familiar and frequent insects around the lights at night during certain months of the year.

Injury.

This species lives underground, and in its natural state probably lives exclusively on the roots and shoots of paspalum and other grasses, but when these paddocks are planted with cane they attack the eyes and young shoots of the cane at the most susceptible period of growth before the young plant has attained sufficient size and strength to withstand the attack. Thus blocks of cane are partially ruined at the outset. It is common for a wireworm to pierce the growing shoot, eat out the central heart, and follow this down for about its own length in the shoot, and then make its exit about an inch lower and continue on with the same injury to another growing set. The first visible signs of attack are wilting, and finally death of the central heart.

Control.

Some of these insects remain in the larval stage from one to three years, and occasionally as long as five years; so that until the life cycle and habits of these pests have been worked out and studied in detail, it will be impossible to attack them successfully from a scientific standpoint. In the meantime it would be advisable to plough in the spring and summer, and preferably plant some crop such as clover or field peas or other plant which is botanically widely separated from the grasses and which is not subject to their attack before planting up these paddocks with cane. This will ensure a good nitrogenous and green manure, as well as reducing wireworm attack to a minimum.

Also the planting of H.Q. 285 (early maturer) on these lands is recommended by the writer, for since planting in these parts is usually done in the spring, and this variety is a very good germinator and rapid grower, it is often able to become established before these pests commence their work of destruction, and has a distinct advantage over those canes which remain a long time in the soil before striking.

For valuable information on this subject I am indebted to the Hon. A. H. Moreton, who claims success against this pest by fertilising his "sets" when first planted with a mixture in which sulphur has been added in the proportion of 15 cwt. of fertiliser to 5 cwt. of sulphur. He gave me the approximate composition of the fertiliser as follows:—Lime 12 per cent., phosphoric acid 7 per cent., potash 5 per cent., nitrogen 4 per cent., and he applies the mixture at the rate of 2 cwt. per acre. Of four blocks on his farm that were planted at the same time, three were treated, while the other was left untreated; the treated blocks were practically unaffected, while the untreated block suffered severe wireworm damage. These blocks were situated in different parts of the farm, and it is to be regretted that no check blocks were left amongst these various blocks; but I think sufficient success was met with to warrant repeating this experiment, setting out proper checks under similar conditions, to determine whether the mixture was the potent factor in warding off wireworm attack.

Moth Borer *(Phragmatiphila truncata).*

This insect is prevalent throughout all the areas visited, and especially is it to be noticed around the headlands and in cane that has been neglected and overrun with weeds. Standover cane appears to be a very favourable breeding-ground for these pests. It is improbable that there will be a further generation of these borers in the Southern districts before the spring, and farmers who have suffered badly through these pests in the last season will be at ease on learning that no more damage is likely to accrue until then.

Lepidiota frenchi.

"Cane grubs" or "white grubs" are strikingly absent in all of these districts, but a few frenchi grubs were found at Takura in some of the older forest soils, and their presence was indicated by bandicoot burrows. However, their numerical strength is very small, and they have never been in sufficient numbers to cause any extensive injury to the cane crops.

FIELD REPORTS.

The Southern Field Assistant, Mr. J. C. Murray, reports (*19th April*, 1926):—

In the course of the month the canegrowing areas of Maryborough, Pialba, and Childers were visited. Work carried out included recommendations as to fertilisation, this being based on knowledge of results on typical soils, indications and methods of control in regard to the major diseases, identification of varieties, and information as to their behaviour in relation to frost, drought, and disease. Information is also frequently sought by farmers on the questions of drainage, irrigation, and farm engineering. Effective drainage is a matter that might be studied more extensively by the growers. It is not possible in these reports to give lengthy explanation or technical details of these subjects, but cane farmers may always get further information on communication with the Bureau.

Maryborough.

Cane in this district was suffering very much from the dry spell, particularly that on the ridges. The crop on the river flats looked better, although the cane that had made was very short in every case. The three varieties making the best showing were M. 1900 Seedling, Q. 813, and H.Q. 285. The firstnamed was looking particularly well along the banks of the Mary River.

The cane at present is looking healthy. The only disease showing freely, and that chiefly on badly drained patches, was the fungoid parasite commonly known as foot-rot.

Weather conditions since the New Year have been so unfavourable that only negative results could be expected from the use of fertilisers. Results obtained, however, point to the value of manures containing potash. It is gratifying to note that fertiliser merchants follow clearly the work done by the Bureal of Sugar Experiment Stations, with the result that there are a number of mixtures of high standard on the market.

A weakness in the cane-farming localities of the Maryborough district—and it really could be applied to all the cane-growing areas in Southern Queensland—is lack of local experiment. The farmer should consider it just as important to set aside an acre of typical soil for local experiment as he considers it important to scarify his ground or erect a silo. Not only could fertilisers and cane varieties be experimented with, but also methods of cultivation, subsoiling, &c., could be practised.

Pialba.

There is a general improvement in farming standards of this district. That most important phase of cane farming—leguminous crop planting for green manures—is receiving considerable attention. As the writer has had a great many inquiries on green manuring and what it actually does for the soil, the following may be of use:—

Soil deficient in humus may be greatly enriched in that substance by growing any quick-growing crop and ploughing it in. By this practice not only is the soil enriched with material derived from the air, but a considerable amount of nitrogen which has been captured during the growth of the crop is restored to the soil. If leguminous crops such as peas or beans are grown, and the crop ploughed in, the nitrogenous store in the soil will be added to, for such crops draw supplies of nitrogen from the air.

In the case of most plants, the roots absorb from the soil water, the phosphates, potash, nitrates, &c., present, and the plant is unable to obtain any sustenance from the free nitrogen of the air. In the case of the legumes, however—peas, beans, clover, &c.—the roots possess small nodular swellings or tubercles, inhabited by micro-organisms which have the power of taking free nitrogen from the air within the soil.

Cane varieties that have best withstood the dry weather conditions in the Pialba district are Q. 813 and D. 1135. On heavy soils the H.Q. 285 and Petite Senneville have made a good showing. Another cane worth more extensive planting is E.K. 28. This cane has consistently made a good showing on high, well-drained soils.

The dry weather since Christmas has neutralised fertilising effort. There is a general tendency towards the greater use of manures than hitherto.

Pests and diseases or noxious weeds are not causing the growers serious trouble.

Childers.

Recent rain has considerably improved prospects in this district. At present the weather is warm and humid—"good growing weather" as the farmers put it. If an open winter prevails there should be a fair crop here by next September—five months in this area often represent a good deal of growth.

The improved weather conditions have stimulated activity, and a number of growers are planting.

The bulk of the cane being planted is M. 1900 Seedling. This cane appears to be doing the best on the high lands, although so far there has been very little experiment with a view to finding a cane that would possibly do better.

Owing to the long spell of dry weather, no definite information could be obtained as to fertiliser results. Farmers who have green-manured their land have noticed the cane has fared better thereon under the dry conditions than on the unmanured. Analyses of soils from Childers which have been manured with legumes show the soil to have a very fair total nitrogen and humus content.

Mosaic was showing fairly freely. There is also a considerable incidence of "foot rot." This disease appears to be spreading, and growers who have it in their fields should, when they cut this crop, plough out and give the land a lengthy fallow. The rotary cultivation should not be used where this disease occurs, but the stools should be taken out and burnt. No plants should be taken from an infected area.

Regarding mosaic and its eradication, farmers should bear in mind that maize and cane are not the only hosts that suffer from mosaic. Sorghum and some grasses are host plants, and Johnston grass also suffers from what appears to be mosaic disease. Corn mosaic frequently produces markings on the stalk similar to those produced by cane mosaic. Both diseases cause shrivelling of the stalk.

As there appears to be some confusion as to the identification of cane varieties in the Childers district, the following descriptions may be of use:—

H.Q. 10.—Moderately stout long cane, colour dull green, good stooler and ratooner, trashing easy; habit erect.

H.Q. 114.—Moderately stout cane, colour purplish, average stooler, good ratooner; trashing easy.

7 R 428 (Pompey).—Stout light-yellowish green-coloured cane, covered with a grey slate-coloured wax; internodes 4 inches long; slightly zigzag; eyes medium, full, and slightly pointed, often has two to three eyes on one node; habit erect; germination good and stools well; foliage is medium and of a dark green; trashes easily.

H. 109.—Light green to yellow cane with a rose blush covered with a white wax; eyes are flat and pointed; internodes 4 to 6 inches long, slightly barrel-shaped; erect in habit; foliage broad and plentiful; free trasher; good striker and ratooner; moderate grower.

Oramboo.—Yellowish-green cane with dark-green blotches; internodes 5 to 6 inches long and zigzag, slight hump opposite eye; has a narrow waxy ring; eyes prominent and spherical, root hairs prominent, foliage good with medium leaf; canes are inclined to lodge; is a good germinator, ratoons and stools well; trash clings slightly.

Korpi.—A dark-green cane with a copper tinge and red blotches; internodes 4 to 5 inches long, slight wax on joint, slight bulge on internode opposite eye; foliage is a little to the heavy side, cane semi-lodging, eyes spherical and fairly large; is a good germinator and ratoons well; trash is slightly clinging.

Several samples of typical soils were taken from this district for analyses.

The Northern Field Assistant, Mr. A. P. Gibson, reports (21*st April*, 1926):—

Tully and Babinda.

These lands are being gradually freed of their dense scrubs for the purpose of extending the sugar areas which are required to produce cane to satisfy the expected capacity of the new Tully Mill. Abundance of land here awaits settlement and development.

The scanty rainfall of December, and the continuance of abnormal dry conditions till late in January, is mainly responsible for the crops' present backwardness. Cane fields of which their respective areas had been included in the coming harvest must for the present be withdrawn, owing to their being so disappointingly backward, therefore the uncertainty of the total area likely to be harvested makes it almost impossible to determine, with any degree of certainty, the grand total tonnage cane likely to be crushed. However, it is computed that 4,000 acres will be cut, yielding (a conservative estimate), say, 80,000 tons.

Much of the cane seen along the railroad side was exceptionally backward, and lacked the dark-green colour which generally denotes rapid growth.

Rainfall.—143.16 inches were recorded last year, and to the 19th March the monthly precipitations were:—January 10.26, February 9.14, to 19th March 11.92; total, 31.32 inches.

The roads were in a very soggy condition, making travelling slow. The trans-Tully River farms are almost inaccessible during wet weather other than by the mill's tramway. This swiftly running stream is now spanned by a bridge.

Varieties.—Farmers must realise the extreme importance of planting disease-free cane varieties suitable for different types of soil; if this is not judiciously considered, great losses may ensue. N.G. 15 (Badila) so far is the champion of canes at present growing in the North, and where this variety will grow well it should be grown. On the poorer forest land the make-up of which varies from an impervious substrata at a shallow depth to a very coarse grainy structure (decomposed granite), soils are not generally conducive for the profitable growing of N.G. 15, but may grow the following varieties:—7 R 428 (Pompey), H.Q. 426 (Clark's Seedling), D. 1135, Q. 813, and the Goru family, N.G. 24 (Brown Goru), 24 A (Striped Goru), 24 B (Green Goru). All these are more or less subject to disease and consequently farmers must exercise the greatest of caution when planting. The Goru variety is sometimes slow in germinating and a shy ratooner—the time of harvesting has an important bearing on the latter characteristic; it is not a good standover cane. D. 1135 is a very erect growing cane, and in consequence does not cover the interspaces as rapidly as most varieties, which means that it requires to be cultivated for a greater time; this difficulty may be overcome to a great extent by making the cane drill centres 3 feet 6 inches. As a rule this variety becomes so weedy that after it has been cut three times it should be ploughed out.

Pests.—The mound-building ant was observed, more especially in the forest lands having a grainy structure.

Termites (white ants) were located in patches devouring the plant sets. Aphis Sacchari and an unusual number of leaf hoppers were noted.

Diseases.—The cane when affected with Brown Rot generally has some 12 to 14 inches of stem. On the whole this area is fairly free from disease. Leaf Scald was rather severe on one farm, having killed many stools of newly-planted N.G. 15 (Badila).

Drainage.—These sugar lands are somewhat cohesive, they gently decline from the banks of the many ever-flowing creeks and rivers, thus forming huge basins (or swamps) from which the water in excess is slow in draining away. Water continues to sink in the soil until its downward progress is arrested by some impervious medium. Should this be near the surface the water level of the soil during wet periods is raised to such a degree that the cane's root system is standing in a pool of water again. Mineral salts leached out of the soil are carried to the surface and deposited as alkali; this greatly impairs its healthy growth, hence the necessity of draining, which doubtless is one of the best mechanical operations known as a soil and crop improver.

Babinda.

Seasonal.—From a canegrowing point of view, the season so far is simply perfect, splendid nightly rains continue to fall, followed by days of misty showers and sparkling sunshine.

Rainfall.—January 40.03, February 7.90, March 19.05, to 10th April 16.31; total, 83.29 inches.

Crop Prospects.—The 1926 crop prospects at present are most encouraging; in growth it is hardly up to usual, save in isolated parts. On the whole it is clean, practically free from pests and diseases and much further advanced than any Northern sugar district so far seen.

Crushing Operations.—It is expected that crushing and harvesting will commence early in June. The estimated cane tonnage to be treated is 190,000 tons, 20,000 of which is standover; this exceeds last year's total crushed by about 26,000 tons.

Labour.—A big staff is engaged on the usual mill overhaul work. Locos. are busy hauling in the seasonal supply of firewood, the greater part of which consists of scrub hardwood. Two tramline extensions, one to and over Harvey's Creek, another through Bucklands on to what is known as 67, will be completed sometime during the season.

Manuring.—The only manure being applied at present is mill compo. It is customary to deposit this in the mill yard during crushing operations and convey it by trucks to farmers desiring it in the slack time; a charge of 5s. a ton is made, which just covers handling costs. This should be distributed over resting grounds

and ploughed in at the farmer's earliest convenience. When left by the railroad, as is noticed, it collects much seed which is eventually distributed with the manure throughout the field. Farmers continue to raise maize adjacent to their growing cane fields. This plant is too similar to cane and is troubled with some of the diseases and pests, such as Mosaic, Leaf Stripe, and even Leaf Scald. It is therefore quite feasible that the insects which frequent both crops may transport such infection from corn to cane. The sugar districts are lacking sufficient protection against the possible ignorant introduction of cane pests and diseases, mainly by the interchange of plants between farmers. Manifestly, this assists greatly in speeding up the ever-rising tide of disease, and should this practice not be arrested the industry is likely to receive some hard knocks.

Bartle Frere, the highest mountain in Queensland, looks down through misty clouds upon the extensive fields of smiling sugar-cane. The soil lying at the foot of this magnificent, densely wooded range, may be classified among the most fertile of soils now producing cane in Queensland. There are two distinct types—(1) the undulating volcanic-deep brick red, drained mainly by the picturesque Josephine Creek, and (2) the excellent Russell River alluvial deposits. The former resembles somewhat the formation of the good old Moongarra soils, though they are less extensive and have not produced for so great a time. Fortunately, these soils are blessed by a wonderful annual rainfall, which with heat is indispensable for continuous crop growth. This assured rainfall is probably brought about by the proximity of the surrounding altitudes to the coast.

Waugh's Pocket.

This comparatively new area is situated some 9 miles south from Babinda, and drained by the Canal Creek, which empties itself into a great adjoining swamp. Five growers are producing cane, mostly of the N.G. 15 variety, and expect to cut about 5,000 tons for 1926. The harvested cane is brought forward in trucks over a private railroad to the main North Coast Line and railed to the Mulgrave Mill.

Birds.—The Ibis is the most valuable of birds, and from a canegrower's point of view is worthy of every encouragement and the protection extended to them.

Pests—Grubs and Termites (white ants).—The former were observed in all classes of soil, from the porous-coarse, decomposed granite to the volcanic red throughout the area; the affected patches are mostly small but increasing daily. Farms lying near the scrubby highlands near Morriwinni are rather severely affected.

Termites.—Grubs are often credited with damage really caused by white ants. Beside devouring cane sets they also tackle the old stubble of ratoons. The above-ground appearance resembles very much the grub symptoms. A mixture of molasses, caustic soda, and arsenic, into which small pieces of soft pine are soaked and then buried shallow where they are, works wonders. If this pest is not checked it is possible that in time the sugar-cane may be found so succulent that its future young may adapt itself to living on it alone.

Diseases.—Suspicious Gum Leaf markings and the red fibre in nodes were observed (although gum could not be made to ooze out of the cane) about ¼-mile from the Babinda Mill. Several portions of leaves were forwarded to Meringa for microscopical examination, and the bacteria characteristic of the abovementioned disease were found to be present.

Leaf Scald.—There are few blocks, if any, absolutely free from this disease. Isolated small portions were found to be suffering severely. The quickest and, perhaps, most direct way to eradicate this disease is by planting disease-free sets. Any suspicious stools met with when cutting seed should be left standing and removed from the paddock as soon as possible.

The total tonnage crushed for the 1925 season at Cairns was 531,789 tons, and the sugar manufactured 72,680 tons.

Mill.	Tons Crushed.	Area Harvested.	Tons Per Acre.
Babinda .. .	164,238	8,818	18·6
Mulgrave	179,754	10,000	17·97
Hambledon	187,797	8,543	21·98
	531,789	27,361	19·8

SOME HINTS REGARDING ENTOMOLOGICAL INQUIRIES.

BY ROBERT VEITCH, B.Sc., Chief Entomologist.

The Department of Agriculture and Stock receives a considerable volume of correspondence asking for advice as to the most satisfactory means of dealing with various insect pests, and the Entomological Division of the Department is always prepared to immediately supply whatever information is available. It unfortunately happens, however, that in many cases no specimens accompany the inquiry, and, in addition to the absence of specimens, the information supplied by the inquirer as to the nature of the damage is often very limited. It thus follows that frequently no definite advice can be tendered until specimens and fuller details have been obtained by further correspondence. Such delay only too frequently means that by the time the advice is received by the inquirer the insect infestation has reached such a stage that the recommendations made are too late to be of much value in checking the particular outbreak under discussion. These recommendations will, however, always be of value for immediate application should there be any recurrence of the trouble. For the reasons just enumerated I wish to impress upon every inquirer the desirability of furnishing specimens, both of the insect responsible for the damage and also of the damage done by it, the specimens to be accompanied by full details as to the nature, extent, and duration of the outbreak. I would further stress the desirability of communicating with the Department of Agriculture and Stock when the insect attack is in its early stages, for delay usually adds to the difficulties of effective control.

The following information is supplied to ensure the receipt of insect specimens in a condition suitable for satisfactory examination and identification:—

1. Insect specimens should never be forwarded in envelopes, because, if they are at all soft-bodied, *e.g.*, fruit flies or aphis, they are generally so squashed in transit as to be of little value for specific identification, while the small harder-bodied insects frequently lose legs or heads in transit in envelopes.

2. Soft-bodied insects, such as aphis and thrips, are best forwarded in a small tube containing alcohol or methylated spirits, the tube being packed in sawdust or cotton wool in a tin matchbox or tobacco tin or similar container.

3. Small hard-bodied insects, such as beetles, wasps, and leathoppers, are best packed in a tin matchbox; a little cotton wool or, failing that, some small pieces of newspaper used as packing inside the box will serve to prevent the insects becoming damaged through undue movement in transit. A drop or two of carbolic acid in the container before packing is of some value in preventing mould, and it also acts as a deterrent to the attacks of other small insects—*e.g.*, ants.

4. Ticks, fleas, mites, and lice can be forwarded in spirit or alcohol in tubes.

5. Butterflies and moths should be killed as carefully as possible and placed in paper triangles made as follows:—Fold along line *a* as shown in Fig. 1, then along line *b*, then along line *d*; this forms a container (shown in Fig. 2) into which the dead butterfly or moth can be slipped after its wings have been carefully folded in such a manner as to prevent the scales of the wings being rubbed off. The triangle can then be closed by folding along the line *cc* and folding along *e*. Place only one butterfly or moth in each triangle. The paper triangles can be packed in a tin and forwarded in the usual manner.

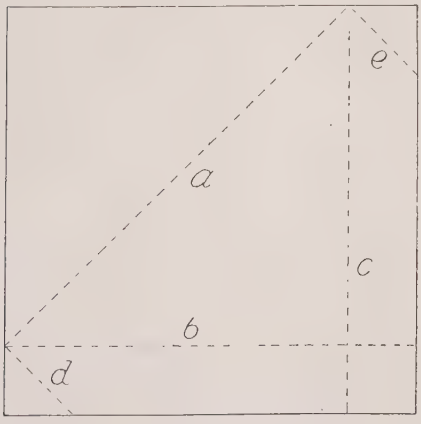


Fig. 1.

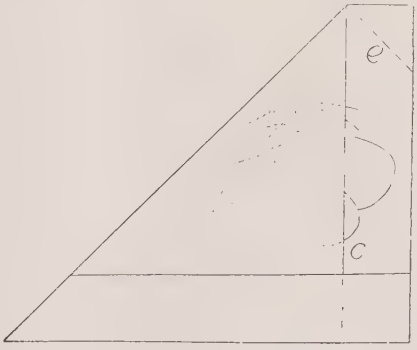


Fig. 2.

6. If the insects are in the caterpillar or grub stage and are alive, place a small quantity of their food plant in the package so that the insects will remain alive until received at the Department of Agriculture and Stock, but pack the food so that it will not move about unduly and thus injure the caterpillars or grubs.

7. If the insect has pupated place it in a tin in which its movements are reduced to a minimum by the judicious use of cotton wool or torn-up pieces of paper.

8. If the inquirer is forwarding insect-infested fruit he should on no account send it in closely sealed tins, because, as a rule, the consignments so forwarded reach the Department in such a fermented condition that the insects they contain are invariably killed by the fermentation generated in such a container; such fruit should be packed in wood wool or straw in a well aired container.

9. Large insects, such as grasshoppers, should have their abdominal contents removed before being packed in a mailing tin.

10. Where plant bugs are being forwarded it is always important to send the fully mature winged forms because the identification of the immature wingless forms is a difficult and in many cases an impossible task; in all inquiries it is desirable that the inquirer should forward as many stages in the insect's life cycle as can be conveniently obtained.

11. Insects are best killed in a "killing bottle," which consists of an ordinary strong bottle with a layer of plaster of Paris and potassium cyanide at the bottom; when this is tightly corked it becomes so charged with hydrocyanic acid gas generated by the potassium cyanide that a few minutes in the bottle generally suffices to kill most insect life.

12. Where a cyanide "killing bottle" is not available a drop or two of chloroform will be found effective in killing many insects.

Specimens of the damage should be forwarded with the insects when the inquiry is made, but it is necessary to send only the portion of the plant that is attacked—*e.g.*, the fruit, or leaf, or root, or stalk, as the case may be.

The details to be supplied by the inquirer will naturally vary, but as a rule the following should be included:—(1) Date of insect outbreak; (2) degree of severity of attack; (3) area attacked; (4) crop attacked; (5) age of crop; (6) general health of crop apart from the insect attack; (7) nature of soil and drainage; (8) nature of surroundings—*e.g.*, is the farm or orchard isolated in uncultivated land or in scrub or is it adjacent to other farms or orchards? (9) measures, if any, already taken to cope with the pest.

The forwarding of specimens and details has been dealt with at some length, because I feel that the outcome of many inquiries will be of a much more satisfactory nature if greater attention is paid to the forwarding of specimens and full details when the inquiry is originally made. All such inquiries should be addressed to the Chief Entomologist, and every effort will be made to supply all available information.

MILK VEINS AND MILK WELLS.

L. VERNEY, Dairy Inspector.

Dairymen are often heard discussing the matter of milk veins and milk wells, more especially when they foregather at show time, but it is surprising to find that there are still a large number of them who know very little of what is meant by the terms and how much importance is attached to them in relation to the milk yield.

The terms are rather vague, and although the majority of dairymen know where they are situated they have a somewhat erroneous idea as to what they are and what their function is. The veins may be located by running the hand from the front of the udder along the under side of the body towards the fore legs. The term milk veins is a misnomer, and is rather misleading, as, of course, no milk ever passes through them. In order to understand the secretion of milk it is necessary to explain the internal structure of the cow's udder The interior is largely composed of a soft spongy fibrous mass. This is known as the milk glands. They are two in number, and lie side by side, each being provided with outlets through the teats. It must be understood that the quarters are distinct from one another, and that the milk from one cannot flow into the other, the milk in each quarter being secreted from the blood supplied from the branch arteries that run from the main trunk arteries. If either of these glands be cut in two and examined innumerable ducts and cavities will be seen, some large and others very small, in fact some of them being invisible to the naked eye. When examined under a microscope several hundreds of ducts and cavities are noticed. Placed above each of the teats is what is known as a milk

cistern. These vary according to the milking capacity of the cow, but they seldom hold more than half a pint. Branching off in all directions from these milk cisterns we find the milk canals or ducts. The higher we ascend into the udder the finer they become. All these fine milk ducts end in innumerable small sack-like cavities known as alveoli. It is in the alveoli where the milk secretion takes place. Each alveolus or cell is surrounded by a dense network of arteries, veins, and lymph vessels. These various vessels supply the gland with the materials used in the composition of milk or carry away the waste blood to the milk veins. The alveoli are slightly egg-shaped, and only measure approximately five-thousandth part of an inch in length. They consist of a very thin structureless membrance lined with single epithelial cells. During the lactation period these cells are enlarged and swollen. During the time the cow is dry they are flattened out and sink together. They hold the milk which is formed during the time of milking. When the process of milking begins the milk flows readily from the fine milk glands into the canals or ducts, and, as these come together to the larger trunks, are united to drops of milk visible to the naked eye.

The development of a large udder necessarily implies a large blood supply, and a large blood supply means a large circulatory system, a large heart, arteries, and veins. Consequently the enlarged and tortuous veins known as milk veins are regarded as a good sign in a cow. Cases, however, have come under review where extraordinary yielding cows have not been possessed with large milk veins visible to the eye for the reason that a second and perhaps larger vein passes through the abdomen and receives the major portion of the blood from the udder.

During the time of milking the elaboration of milk goes on at a very rapid rate, and calls for an increased supply of blood to the udder. As before mentioned there the blood circulates through the very minute glands, and part of it is changed into milk. It can be readily understood that in a heavy producing cow the flow of blood to the udder will be very rapid. The waste blood is now carried from the udder through the veins to the vital organs, where it is purified once more and again circulated through the body. Where these veins enter the body will be found fairly large openings. These are known as milk wells. Great importance is attached to these milk veins and milk wells from the fact that the larger quantity of blood that can be passed through the udder during milking time (when milk is found the fastest) the better the cow will be regarded as a milk producer; consequently a cow possessing large tortuous, branching milk veins extending well forward towards the fore legs, and there entering the body through large wells or openings is usually looked upon as being strong in this important dairy point.

A great deal could be written on this subject as touching our milk production, but the foregoing is sufficient to show in a simple way that when selecting dairy cows the matter of milk veins and milk wells should not be overlooked.

CARE AND HANDLING OF CREAM.

L. VERNEY, Dairy Inspector.

Carelessness is not, as often claimed, due to a lack of knowledge, as I am confident nearly every dairy farmer has read in some agricultural paper or journal dealing with the dairying industry, or he has heard someone tell how to take proper care of milk and cream. I therefore think that it is not the knowledge that is lacking, but that it is the lack of good will. It is the carelessness, the slovenliness, the dirty habits that we must overcome. It is recognised that in some cases cream taint from weeds cannot be avoided, still it must be admitted that there are far too many defects that are, directly or indirectly, the fault of the individual dairyman Most of the defects in cream can be avoided, and at the same time a better feeling created between the supplier and the butter factory if those concerned take more interest in their cream supply.

The following hints are offered, and if suppliers will follow them out a marked improvement will be soon noticed—

1. Never fail to provide an ample supply of clean water and cloths for cleansing the udders and flanks of the cows. In dairies where large numbers of cows are milked daily it will be found necessary to change the water frequently. Always wash your hands before milking each cow. See Regulations 32 and 33 of the "*Dairy Produce Act of* 1920."

2. Do not leave the milk in open cans in the milking shed, as it is by this means that the milk absorbs the many and varied taints that arise therefrom. If it is not possible to remove the milk immediately it is drawn from the cows beyond the

confines of the milking shed, a suitable covering (a piece of thick flannelette will suffice) should be provided for each receptacle. See that these coverings are thoroughly cleansed each day and not just rinsed out in the wash-up water.

3. Do not use kerosene or petrol tins in a dairy. These receptacles are the cause of a large amount of second-grade cream owing to the fact that they cannot be properly cleansed. The open seams are the trouble.

4. It is most important that the cream be cooled as quickly as possible after separating, and always keep it in a pure, cool atmosphere.

5. Use buckets for each separation, and keep the cream well agitated each day. Before sending the cream away be sure and thoroughly mix the whole, so that a uniform sample will be obtained at the factory.

6. Always scald your cans with hot soda water as soon as you receive them from the factory. On no account place any cream in the cans until you have thoroughly cleansed and aired them.

7 Strain the cream before sending it away, and during its transit see that it is effectively shaded from the sun's rays. The cooler you can deliver your cream at the factory the better.

8. Keep your milking shed and dairy surroundings in a sanitary condition.

9. Always remember that cleanliness from start to finish is the chief factor in a first grade cream supply.

MOUNT GRAVATT EGG-LAYING COMPETITION.

Queensland poultry breeders have been responsible for the establishment of many egg-laying records from which the competition just completed does not detract.

The highest number of eggs laid for a pen of six hens was 1,626, while 306 was the top score for an individual bird. In both cases the breed was white lenghorn, owned by Messrs. W. and G. W. Hindes, of Manly.

It is believed that the Queensland record for a pen of this variety is 1,614, but, unfortunately, these birds failed by ·22 of an ounce to obtain the average weight of 24 oz. per dozen of eggs, and are consequently disqualified. There were several other pens that established high yields, but were unfortunately disqualified for the same reason. The average production per bird for twelve months was 206·6 eggs.

Following is a complete list of prize winners:—

SECTION 1.—LIGHT BREEDS, ALL WHITE LEGHORNS.

Group of Six Birds.

	Eggs.
1st—S. L. Grenier	1,468
2nd—J. J. McLachlan	1,456
3rd—G. W. Cox	1,433

Single Bird.

1st—J. Harrington	283
2nd—W. and G. W. Hindes	279
3rd—S. L. Grenier	277

Winter Test.

(Total eggs laid from 1st May to 31st July.)

1st—J. Harrington	380
2nd—W. G. Woodward	373

SECTION 2.—HEAVY BREEDS, BLACK ORPINGTONS.

Group of Six Birds.

1st—E. W. Ward	1,248
2nd—R. Burns	1,185
3rd—J. Potter	1,182

Single Bird.

1st—Mrs. A. E. Gallagher	257
2nd—E. W. Ward	250
3rd—Mrs. A. E. Gallagher	240

Winter Test.

(Total eggs laid from 1st May to 31st July.)

1st—G. E. Rogers	394
2nd—E. W. Ward	388

SCHEME FOR STANDARDISATION OF VARIETIES OF WHEAT GROWN IN QUEENSLAND AND FOR THE PROPAGATION, GRADING, CLEANING, AND DISTRIBUTION OF SEED WHEAT.

H. C. QUODLING, Director of Agriculture.

It has long been recognised that a high standard of quality in agricultural and live stock products can only be reached and maintained by systematic effort directed along certain defined lines of improvement. The wheat-grower's success and that of the industry are dependent largely on the use of varieties suitable to the environment in which they are to be grown and the system of farming adopted. In this article Mr. Quodling propounds a scheme for standardising varieties, and discusses other matters of importance to wheat-growers of Queensland.—Ed.

Conditions in Queensland differ from those common to the Southern wheat-growing States. Winter rains are not quite so regular here and, partly on this account, there will always be a demand for "late," "mid-season," "medium early," and "early maturing" rust-resistant varieties which may be planted during the currency of the season and synchronising with the length of time taken by each class of wheat to mature.

Another factor to be taken into consideration is that wheat, in many instances, is grown as a dual purpose crop, the green fodder being relied upon during the early growing season as the main part of the diet of milch cows, and to some extent for sheep, it being recognised that when abundant rains are experienced, the feeding off checks the rank growths common on such occasions to the rich soils of the Darling Downs wheat belt.

Under present-day methods of harvesting, different wheats which may be ripening simultaneously in the same field are apt to be mixed; and no matter how careful a classer who receives wheat for delivery to the existing Wheat Pool may be, it is certain that any special lines of grain reserved for seed may be more or less mixed with other varieties. When such wheat is subsequently sold as seed, it follows that in a season or two the proportion of foreign varieties will be most pronounced.

In explanation, it may be stated that in grading wheat of small or of medium size in which grain with a larger "berry" foreign to the variety is found, the latter finds its way into the No. 1 grade. In a season or two the natural increase of the larger "berried" wheat is most pronounced. Similarly, the purity of any kind of wheat may be adversely affected in an increasing ratio, if the original sample contained grain foreign to the variety being grown, or when "self-sown" wheat grows up with the crop. This will serve to show how necessary it is to start with a pure strain and to rogue fields just before harvest time, when the strangers can be more readily recognised.

Apart from the more important work of breeding and distributing wheats calculated to suit Queensland conditions, which the Department of Agriculture and Stock has carried on for practically a-quarter of a century, it is obvious that improvement in the quality, type, and yield of Queensland-grown wheat can only be brought about by the growers, through their representatives on the Wheat Pool Board, engaging in the business of raising their own seed, the best of its kind, and ensuring as far as it is humanly possible to do so, that only clean, graded grain, true to type and free from disease and impurities, is distributed and planted. With a view to bringing about a much desired improvement in this direction, a subject in which great interest has been shown by growers, a conference was held on 30th March at Toowoomba between the Wheat Board and two officers representing the Department of Agriculture and Stock, Mr. K. E. Soutter, manager and wheat breeder at Roma State Farm, and the Director of Agriculture (Mr. H. C. Quodling). The proposals (with the accompanying classification chart) put forward by the latter officer and outlined hereunder, were unanimously adopted by the Board. Action has already been taken under the scheme to select a number of seed propagation farms in different wheat-growing districts, where pure seed is to be grown this season for delivery to the Board.

TO ALLOW THE FULL TIME NECESSARY IN WHICH TO DEVELOP IN NORMAL SEASONS, THE RESPECTIVE VARIETIES SHOULD BE SOWN IN THE PRINCIPAL WHEAT-GROWING DISTRICTS ON THE DARLING DOWNS, AS FOLLOWS:—

SLOW MATURING	S M	EARLY IN APRIL.
MID SEASON	M S	2ND TO 4TH WEEK IN MAY.
MEDIUM EARLY	M E	2ND TO 3RD WEEK IN JUNE.
EARLY	E	4TH WEEK IN JUNE TO 3RD WEEK IN JULY.

NOTE.—ADJUSTMENTS REQUIRE TO BE MADE TO SUIT THE SLIGHT DIFFERENCES IN SEASON (EARLIER OR LATER) COMMON TO OTHER WHEAT-GROWING DISTRICTS.

TIME OF MATURITY OF WHEAT: S M—SLOW MATURING. M S—MID SEASON. M E—MEDIUM EARLY. E—EARLY.

CONDITION OF GRAIN: H– HARD. M H MEDIUM HARD. M S—MEDIUM SOFT. S—SOFT.

TYPES OF SOILS: H—HEAVY SOILS, BLACK SOIL PLAINS.—VOLCANIC LOAMS, DOWNS COUNTRY. M H· MEDIUM, MEDIUM HEAVY LOAMS.—CLAY LOAMS. L AND S L—LOAMS AND SANDY LOAMS,—FREE WORKING LOAMS INCLUDING, THOSE ALLUVIAL IN CHARACTER. S—SANDY SOILS.

| Group. | Name of Variety. | CLASSIFICATION. Time of Maturity. | | | | | | Condition of Grain. | | | | | | Pittsworth (Eastern Boundary Linthorpe and Milmerran Branch, Mount Kent and West Thereof. | | | | | | Chinchilla and West Thereof to Mungallala. | | | | | | Oakey to Chinchilla including Branch Lines. | | | | | Toowoomba District, East of Oakey, including Crow's Nest and Haden Lines and extending Southerly as far as King's Creek. | | | | | Clifton, Allora, and Warwick Districts from King's Creek across the Head of Goomburra and Killarney Lines, thence to Cherry Gully and to Greymare and North-West to Ellangowan. | | | | | Greymare and along South-West Line where Wheat is Grown. | | | | | Nanango, Kingaroy, Wondai, Murgon, and Gayndah Districts. | | | | |
|---|---|---

1 Cedric (Red) . .
1 Coronation . .
1 Comeback . .
1 Florence . .
2 Budde Early . .
2 Currawa . .
1 Gluyas . .
2 Hermitage . .
2 Novo . .
1 Pusa 4 . .
2 Roma Red . .
2 South.r's Early
1 Three Seas . .
2 Warchief . .
1 Warren . .
2 Warrior . .
2 Watchman . .
2 Pusa 12 . .

The scheme proposed by the Department of Agriculture and Stock for the standardisation of varieties of wheat grown in Queensland, and for the propagation, grading, cleaning, and distribution of seed wheat, has great possibilities, and the hearty co-operation of growers is desired. Following are the details:—

1. The Department of Agriculture to co-ordinate its wheat-breeding and wheat-testing work and to link it up with the activities of the Wheat Board.

2. The scientific and technical work necessary to give effect to the scheme to be carried out as at present by the Department of Agriculture, and, when seed of new and improved varieties recommended by the Department is available from time to time in sufficient quantities, the approved grower to take it over by purchase (at a price to be mutually agreed upon at the time), and make arrangements for sowing the respective varieties in localities on picked areas, on similar lines to those detailed under Clauses 9 and 10.

3. The Board, in sequence, to secure seed from these sources, rail it to its central depôt for cleaning, fumigating, grading, and storage, for ultimate despatch to the localities decided upon for the commercial propagation of specified types of wheat.

4. For the purposes of the successful working of the scheme, and of the production of standard types of grain, the State to be classified into districts or zones, so that efforts may be directed towards the growing of suitable types and varieties within each, for delivery to and subsequent distribution by the Board. In this way it would be possible to draw upon certain classes of grain for milling or export, as may be required.

5. That a classification be made as per attached Schedule, of varieties now in cultivation, with a view to the discarding of those which are undesirable or unsuitable for Queensland conditions, or which are of soft, starchy, poor milling, or indifferent keeping qualities.

6. That the Board take the necessary steps to further this latter object, by ensuring the delivery by the grower of all wheat to the Board which comes under this latter category. In this way, the usual reservations or arrangements for next season's seed by the grower will be brought into line with the policy of standardisation, as the approved wheats can then be supplied in lieu thereof.

7. That for the purpose of ensuring the preservation of pure supplies of seed of varieties finally approved of under the scheme, the Department to continue the work of seed selection by maintaining small nursery plots at its wheat-breeding or on other farms, with the object also of the improvement by selection, and the maintenance of certain strains within the respective varieties, which could be drawn upon, should the identity or purity to type of the original varieties require to be renewed at any time.

8. That the Wheat Board appoints a man specially fitted to take charge of its seed-wheat business.

9. That Seed Propagation Farms be chosen in different districts by a member of the Wheat Board and a Field Officer of the Department, on which supplies of pure seed of one or more varieties are to be grown on clean ground from year to year, by arrangement with the owner of the farm, who would be paid a premium by the Wheat Board of, say, 6d. per bushel for approved seed drawn from crops rogued before the grain is harvested.

10. That provision be made under the scheme for the growing each year of wheats in No. 1 and No. 2 groups, representing standard and approved varieties recommended by the Department of Agriculture and Stock, and agreed upon, in conference, by the Wheat Board.

11. That up-to-date seed cleaning and grading machinery be installed by the Board at one or more centres as may be determined, so that all grain used for seed purposes may be pure to type and free from impurities.

12. That the Board endeavours to eliminate Bunt (or Smut) from all Queensland grown wheat.

13. That, in order to place the Queensland wheat-grower in the best possible position, every encouragement be given by the Board to bring about the elimination of undesirable and unsuitable varieties, and the substitution of approved kinds by sale or exchange.

14. That seedsmen dealing in seed wheat be furnished by the Department of Agriculture and Stock with an outline of the scheme, in order to secure their active co-operation in effecting its aims and objects by placing varieties purchased from the Board, or other sources, with growers in districts or zones to which such varieties have been allotted.

THE NAMING OF WOODS.

By E. H. F. SWAIN, Chairman, Provisional Forestry Board.

Whilst the botanist has been pursuing the species and their varieties with commendable zeal in order to permanently capture them for their botanical christening, and whilst he has succeeded in imposing upon the parent plants an ordered series of appropriate names, it has been left to the bushman to name and nickname the wood product of the vegetable kingdom. Despite the great commercial importance of the standardisation of timber nomenclature, the timber-getter has been left the unchallenged authority upon the subject, and he has made a shocking mess of it. He has spoken in many voices and in many places, and there is babel in the timber world to-day.

In one district a tree is called Blue Gum because the bark is bluish, and in another it is called Red Gum because the wood is red. There is a Blue Gum in Tasmania which has a yellowish wood, and a Blue Gum in New South Wales with a red wood, and also a River Red Gum—and the Blue Gum is often called Flooded Gum and is unrelated to the Queensland Blue Gum, which is really Red Gum.

There is a Crow's Foot Elm which is also called Booyong, Raywood, Ash-Meganti, Stavewood, Ironwood, Silky Elm, Brown Oak, and Hickory according to the district, whilst in the Philippines it is known as Lumbayao. There is a Crow's Ash in Queensland which is called Teak in New South Wales, yet it is unlike Teak, whilst the wood that is of the Teak type in structure, uses, and botanical order has been dubbed Beech after the European Beech, to which incidentally it bears no resemblance whatever. There is a Red Mahogany in New South Wales, called so by the early settlers because of its superficial resemblance to Honduras Mahogany, and there is another tree resembling Red Mahogany in bark and habit, which, as a corollary, has been called White Mahogany because the wood is white. In Queensland, both these woods are called Red and White Stringybark; but White Stringybark in New South Wales is a different wood again, a wood, however, which in structure is of the Western Australian Jarrah type. There is a Bolly Gum which is not a gum at all, but a timber resembling Queensland Maple, which is not a Maple either, but was originally called Red Beech (because it is somewhat like White Beech) which is not like Beech at all, but is really an Australian Teak.

The confusion is extraordinary, but the same haphazard naming of woods is proceeding all over Australia and science fears to tread where the bush lawyer rushes in.

Absence of Laws for Timber Nomenclature.

That the matter is of importance to forestry and the timber industry as a whole is indicated by the attempts made by successive Australian Forestry Conferences to secure agreement, but agreement even between those with a common aim has not been practicable so far because the laws of timber nomenclature have not yet been enacted. To me it appears that the consideration and adoption of principles is the first and greatest step.

Custom hallows even an unsuitable appellation if it be single in its blessedness, but, fortunately for the future of the Australian timber markets, there are so many name competitors for selection that even if it became difficult to choose between them, a compromise or non-compromise candidate may always be secured. The fact that an unsuitable name exists or has existed for twenty years is not warrant, therefore, for its enthronement for the rest of time.

In choosing a standard series of timber names, it appears to me that we may very well take a leaf off the botanist's family tree. Orders and genera are stable and may not be upset by unscientific usurpers. If a Linden tree is a Linden tree, it remains a Linden tree the world over. If a Pinus is a Pinus in Europe, it cannot be called a Juniperus in the Antipodes. If a Mahogany wood is a Mahogany wood in Honduras or London Docks, then only woods of the same structure, type, and value standards should be styled a Mahogany elsewhere. If Teak is the established name for a definite sort of timber, the name must not be usurped by a pretender with none of the reigning blood in him. If a Box is a certain type of wood accepted the world over as the type suitable for specific purposes, such as draftsmen's scales, then our Yellow and Grey Boxes are usurpers, for they really belong to the Ironbark set. If our White Beech is really of the Teak family of woods, it should be called Australian Teak instead of awarding the name to *Flindersia australis* which has no resemblance to Teak.

Let us accept the established orders of wood types the world over, the Mahoganies, the Rosewoods, the Oaks, the Ashes, the Alders, the Birches, the Boxwoods, the Teaks, the Beeches, the Bulletwoods, the Walnuts, and so on. Let us erect these definite and accepted wood types as our commercial genera and if of such types we have an Australian representative let us attach the appropriate adjective. If we have still other types let us establish new genera.

An appropriate set of principles for wood naming might be as follows:—

(1) Timbers should be named upon their timber values and not upon the appearance of the parent tree.

Red Gum should not be called Blue Gum in Queensland because the bark is blue. The generic substantive should place the wood in its structure type, whether it be a Beech or an Oak type, and the specific adjective should describe the colour or other special quality of the wood type. An Oak wood may be White or Red and a Walnut wood may still be called a Walnut even if it be a Pink Walnut.

Burgundy and Champagne were local names but they are now established world standards for certain types of wine. Because Australia produces these types of wine in Australia, there is no reason why we should call them Wantabadgery or Woolloomooloo. Australian Burgundy and Australian Champagne are legitimate and suitable names. And so with timber.

(2) Established English spoken names for wood types should be continued in Australia with such adjectival differentiation as may be appropriate to them.

(3) Distinctly Australian wood types—that is to say, new wood genera—may and should certainly be given new or Australian generic names—the Ironbarks for instance.

If these principles be accepted and applied, as they are in botanical science and in every other science, we shall have a new condition of things wherein every wood has only one type name, and that type name so appropriate and descriptive that its acceptance by the commercial world becomes inescapable. I agree that if a name is not appropriate and descriprive it has small chance of survival even if arbitrarily imposed, but I am sure that the timber world would welcome the scientific definition which it now lacks in wood nomenclature. Science has no right to stand apart from industry and content itself with Latin christenings. Let us, therefore, endeavour scientifically to dispose of the babel of unauthorised versions of timber names.

The System of the Queensland Forest Service.

The Queensland Forest Service has adopted a system of classifying timbers, by means of an index, which has been styled an Universal Wood Index, and which more or less brings together in their due sequence all the well-known woods in the world. It becomes possible thereunder to group them into their commercial genera, and then to apply to them the appropriate trade appellation and its local specific adjective. As a corollary to the work of the wood Index, an attempt has been made to apply to Queensland woods the general principles of nomenclature here laid down. The index has not been slavishly followed where certain unindexed factors tends to push a wood out of its index class, and every effort has been put forth to secure a name which is appropriate, description, and as far as possible acceptable to trade (The names which have been adopted are published in the list appended.) In some cases, proposals more or less radical are made. The fact that our Box is not a Boxwood has led me into my most revolutionary proposition which is that we should have here two generic groups, the Boxwoods and the Ironboxes, so that Grey and Yellow Box which abide with the Ironbark set would become Grey Ironbox and Yellow Ironbox. Similarly, Grey Gum, which as a wood is so close to Grey Ironbark that it is extremely difficult to separate therefrom, would become Grey Irongum, and thus be removed from the lighter, softer gum tree woods such as Flooded and Scribbly Gums—an entirely different type.

Apart from these overbold but justifiable departures from constant usage, no very grave considerations arise to which exception can be taken. If general principles are followed, the new names, or any popularly acclaimed improvement of any of them, will stand on their own feet and serve the timber trade as it never has been served before.

QUEENSLAND FOREST SERVICE INDEX COLLECTION OF TIMBER WITH COMMON NAMES AND ADOPTED OFFICIAL VERNACULARS.

Botanical Identity.	Present Vernacular.	Official Vernacular.
Erythrina indica ..	Cork Tree	Grey Corkwood
Erythrina vespertilio ..	Cork Tree, Shield Tree, Coral Tree	Grey Corkwood
Cordia Myxa	Sebastian Tree	Grey Corkwood
Ficus glomerata	Cluster Fig (N. Queensland)	Brown Figwood
Ficus macrophylla ..	Moreton Bay Fig ..	Brown Figwood
Elæocarpus grandis ..	Quandong, Blue Fig (N.S.W.), Silver Beech, Caloon	Silver Quandong
Elæocarpus coorangooloo ..	Coorangooloo	Brown Quandong
Elæocarpus ruminatus ..	Quandong (Mackay) ..	Grey Quandong
Ailanthus imberbiflora ..	White Bean (Imbil) .. Sassafras (Samford)	White Siris
Albizzia toona	Mackay Cedar, Acacia Cedar (Cairns)	Red Siris
Aleurites moluccana ..	Candlenut (Atherton) ..	Candlenut Siris
Pithecolobium pruinosum ..	Snowwood (Imbil) ..	Tulip Siris
Pithecolobium grandiflorum	..	Tulip Siris
Gmelina Leichhardtii ..	White Beech (South Queensland)	Grey Teak
Gmelina fasciculiflora ..	White Beech (Atherton) ..	Grey Teak
Flindersia acuminata ..	Putts Pine (Atherton) .. Silver Maple	White Silkwood
Flindersia Brayleyana ..	Maple, Queensland Maple, Red Beech (Atherton)	Maple Silkwood
Flindersia Pimenteliana ..	Silkwood .. .. .. Silky Maple (Atherton)	Rose Silkwood
Lucuma galactoxyla ..	Cairns Pencil Cedar .. Cairns Maple	Red Silkwood
Cinnamomum Tamala ..	Native Camphor	Camphorwood
Cinnamomum Oliveri ..	Native Camphor	Camphorwood
Litsea reticulata	Bolly Gum, Bally Gum (N.S.W.) Sycamore (N.S.W.)	Brown Bollywood
Litsea ferruginea	Soft Bolly Gum .. .. Bolly Beech	Brown Bollywood
Persea Baileyana	Nutmeg Bark (Fraser Is.)	Brown Bollywood
Cryptocarya Bancroftii ..	Yellow Walnut (Atherton)	Canary Ash
Flindersia Schottiana ..	Bumpy Ash (Queensland) Cudgerie (N.S.W.)	Silver Ash
Flindersia australis ..	Crow's Ash (Queensland) .. Teak (N.S.W.) Flindosa (N.S.W.) Flandowsee (Queensland)	Crow's Ash
Flindersia pubescens ..	Ash (Atherton)	White Ash
Flindersia collina ..	Stave Wood (N.S.W.) .. Hill Flindersia (N.S.W.) Leopard Wood (Q'land)	Leopard Ash
Flindersia Bourjotiana ..	Ash (Atherton)	White Ash
Flindersia Ifflaiana ..	Cairns Hickory	Hickory Ash
Flindersia Oxleyana ..	Yellowwood (Sth Q'land) .. Flandowzee (Maryborough)	Yellowwood Ash
Flindersia Bennettiana ..	Mountain Ash .. .. Bennett's Ash	Bennett's Ash
Euroschinus falcatus ..	Pink Poplar, Maiden's Blush, Ribbonwood (N. Queensland) Cudgerie (Queensland)	Blush Cudgerie
Bursera australasica ..	Mango Bark (Fraser Is.) ..	Brown Cudgerie
Trema amboinensis ..	Peach Leaf Cedar (North (Queensland)	Brown Cudgerie
Panax Murrayi	..	Pencil Cudgerie
Alstonia scholaris ..	Milkwood (N. Queensland)	White Cheesewood

QUEENSLAND FOREST SERVICE INDEX COLLECTION OF TIMBER WITH COMMON NAMES AND ADOPTED OFFICIAL VERNACULARS—*continued.*

Botanical Identity.	Present Vernacular.	Official Vernacular.
Sarcocephalus cordatus ..	Leichhardt Tree (North Queensland)	Yellow Cheesewood
Melia composita ..	White Cedar	Tulip Cedar
	Brown Cedar	
Cedrela australis	Red Cedar	Red Cedar
Schizomeria ovata ..	Whitewood (Fraser Island)	White Sycamore
	Crab Apple Pine	
	Humbug (S. Queensland)	
Synoum glandulosum ..	Scentless Rosewood (Fraser Island)	Red Sycamore
Weinmannia spp.	Blood-in-the-bark (North Queensland)	Satin Sycamore
Evodia ovatiflora	..	Cork Sycamore
Evodia micrococca ..	Stinker (Imbil)	Silver Sycamore
Evodia littoralis	..	Silver Sycamore
Musgravea stenostachya ..	Brown Oak (Atherton) ..	Briar Oak
Macadamia prælta ..	Bull Nut (Imbil)	Nut Oak
Embothrium Wickhamii ..	Pink Oak (N. Queensland)	Satin Oak
Macadamia ternifolia ..	Queensland Nut	Bauple Oak
	Bauple Nut	
Cardwellia sublimis ..	Bull Oak (N. Queensland)	Silky Oak
	Silky Oak (S. Queensland)	
Helicia sp.	Silky Oak (Mackay) ..	Silky Oak
Grevillea robusta	Silky Oak, Scrub Beefwood (S. Queensland)	Silky Oak
	Black and White Silky Oak (Northern Rivers, N.S.W.)	
Grevillea Hilliana ..	..	Beef Oak
Orites excelsa	Silky Oak (Killarney) ..	Waratah Oak
Carnarvonia araliæfolia ..	Red Oak (N. Queensland)	Caledonian Oak
Grevillea pinnatifida ..	Glassy Oak	Beef Oak
Grevillea striata	Beefwood (N. Queensland)	Beef Oak
Banksia serrata	Wallum	Wallum Oak
Banksia æmula	Honeysuckle (N.S.W.) ..	Wallum Oak
Banksia integrifolia ..	Honeysuckle	Honeysuckle Oak
	Wallum	
	White Honeysuckle	
	Coast Honeysuckle	
Banksia littoralis	..	Honeysuckle Oak
Xylomelum pyriforme ..	Wooden Pear	Pear Oak
Stenocarpus sinuatus ..	White Oak	White Oak
	Wheel of Fire Tree (North Queensland)	
Hakea lorea	Needlewood	Needlewood Oak
Ackama Muelleri	Pencil Cedar	Pencil Alder
	Sugar Bark (Mackay)	
	A Corkwood (N.S.W.)	
Ackama quadrivalvis ..	Feathertop (N. Queensland)	Rose Alder
	Pencil Cedar	
Eugenia parvifolia ..	Water Myrtle	Cherry Alder
	Cherry (Fraser Island)	
Exocarpus cupressiformis ..	Forest Cherry	Pink Cherrywood
	Mock Cherry (Imbil)	
	Native Cherry (N.S.W.)	
Commersonia echinata ..	Fibrewood (Imbil) ..	Brown Kurrajong
Codoncarpus australe ..	Kurrajong	Brown Kurrajong
Stercolia discolor	Sycamore Tree	White Kurrajong
	Hat Tree	
	White Poplar	
Stercolia acerifolia ..	Flame Tree	Flame Kurrajong
	Scrub Kurrajong	
Stercolia diversifolia ..	Forest Kurrajong ..	Forest Kurrajong

QUEENSLAND FOREST SERVICE INDEX COLLECTION OF TIMBER WITH COMMON NAMES AND ADOPTED OFFICIAL VERNACULARS—*continued.*

Botanical Identity.	Present Vernacular.	Official Vernacular.
Pleiococca Wilcoxiana	Mushy Berry (Fraser Is.) Wilcox Wood (Mackay)	Silver Aspen
Podocarpus amara	Black Pine (Atherton)	Black Pine
Podocarpus elata	She Pine (S. Queensland) Brown Pine Brush Pine (N.S.W.)	Brown Pine
Araucaria Cunninghamii	Hoop Pine Moreton Bay Pine (Q'land) Colonial Pine (Sydney) Richmond River Pine (N. Rivers, N.S.W.)	Hoop Pine
Araucaria Bidwilli	Bunya Pine (Queensland)	Bunya Pine
Agathis robusta	Dundathu Pine Kauri Pine (S. Q'land)	Kauri Pine
Agathis Palmerstoni	Kauri Pine (N. Q'land)	Kauri Pine
Callitris glauca	Cypress Pine White Cypress (W. Q'land)	Western Cypress
Callitris arenosa	Sand Cypress	Coast Cypress
Callitris calcarata	Black Cypress (W. Q'land) Black Pine and Red Pine (N.S.W.)	Black Cypress
Hibiscus tiliaceus	Coast Cotton Tree	Green Cottonwood
Panax elegans	Celery Wood (S. Q'land) Black Pencil Cedar (N.S.W.)	Silver Basswood
Duboisia myoporoides	Corkwood	White Basswood
Doryphora sassafras	Sassafras (S. Q'land) Black Sassafras (N.S.W.)	Grey Sassafras
Daphnandra micrantha	Yellow Box (Imbil) Yellow Sassafras Light Yellowwood (N.S.W.) Socket Wood	Grey Sassafras
Daphnandra repandula	Sassafras	Grey Sassafras
Daphnandra aromatica	Sassafras	Grey Sassafras Red Carrobean
Sideroxylon Richardii	Coondoo Milk Bark (S. Queensland)	Blush Coondoo
Eugenia Francisii	Watergum (Imbil)	Pink Satinash
Eugenia spp.	Red Eungella Gum	Rose Satinash
Eugenia helimampra	Hard Cherry Red Myrtle (Fraser Island)	Rose Satinash
Eugenia sp.	White Eungella Gum	Grey Satinash
Eugenia gustavioides	Water Gum (N. Q'land)	Yellow Satinash
Eugenia brachyandra	Pink Plum (Imbil)	Brown Satinash
Eugenia Ventenatii	Water Myrtle (Imbil)	Myrtle Satinash
Eugenia macoorai		Red Satinash
Cryptocarya Mackinnoniana	Koongoojaroo	Grey Walnut
Cryptocarya erythroxylon	Pigeonberry Ash (S. Q'ld.) Southern Maple	Rose Walnut
Cryptocarya obovata	Purple Laurel (Imbil) Pepperberry Tree She Beech (N.S.W.)	White Walnut
Endiandra discolor	Plum Apple Tick Wood (N.S.W.)	Rose Walnut
Endiandra Sieberi	Corkberry (Fraser Island) Corkwood and Till (N.S.W.)	Rose Walnut
Beilschmiedia elliptica	Hard Bolly Gum Walnut (Fraser Island)	Grey Walnut
Beilschmiedia obtusifolia	Hard Bolly Gum (Imbil) Pencil Berry (Fraser Is.)	Blush Walnut
Cryptocarya corrugata	Corduroy (N. Queensland)	Oak Walnut
Alphitonia franguloides	Sarsaparilla (N. Q'land)	Blush Butternut

QUEENSLAND FOREST SERVICE INDEX COLLECTION OF TIMBER WITH COMMON NAMES AND ADOPTED OFFICIAL VERNACULARS—*continued.*

Botanical Identity.	Present Vernacular.	Official Vernacular.
Blepharocarya involucrigera	Bolly Gum (N. Q'land)	Rose Butternut
Eucalyptus saligna	Flooded Gum (Q'land) Sydney Blue Gum (N.S.W.) Blue Gum (N.S.W.) Brush Gum (N.S.W.)	Rose Gum
Eucalyptus dealbata	Inland Red Gum (N.S.W.) Crossed Gum Tumble Down Gum	Blood Gum
Castanospermum australe	Moreton Bay Bean Moreton Bay Chestnut Black Bean Beantree	Black Bean
Endiandra Palmerstoni	Black Walnut (N. Q'land)	Walnut Bean
Dysoxylon Muelleri	Red Bean Kedgy Kedgy Miva	Miva Mahogany
Dysoxylon cerebriforme	North Red Bean Brain Fruit (N. Q'land)	Miva Mahogany
Dysoxylon Fraseranum	Rosewood (N.S.W.) Rose Mahogany (Q'land)	Rose Mahogany
Acacia implexa	Black Wattle (Fraser Is.)	Brown Salwood
Acacia Cunninghamii	Black Wattle (Brisbane)	Brown Salwood
Acacia aulacocarpa	Hickory Wattle Blue Wattle (Imbil) Brush Ironbark (N.S.W.)	Brown Salwood
Acacia Bakeri	White Wattle Hickory	White Salwood Yellow Beech
Villaresia Moorei	Soap Box (Killarney) Churnwood (N.S.W.)	Silky Beech
Pennantia Cunninghamii	Pennantia (Fraser Island)	Brown Beech
Symplocos Thwaitesii		Satin Beech
Rhodosphæra rhodanthema	Yellow Cedar Deep Yellowwood Chinaman's Cedar Yellowwood (N.S.W.)	Yellow Satinwood
Zanthoxylum veneficum	Satinwood	Canary Satinwood
Litsea dealbata	Small Litsea (Imbil)	Grey Birch
Cryptocarya glaucescens	Filipino (Imbil)	Yellow Birch
Elæocarpus obovatus	Beech Blueberry Ash (Imbil)	White Carrobean
Litsea chinensis		White Carrobean
Sloanea Woolsii	White Carrobean (S. Q'land)	Grey Carrobean
Sloanea australis	Pencil Cedar (Imbil) Maiden's Blush (N.S.W.) Salter's Cedar	Blush Carrobean
Weinmannia Benthami	Red Carrobean	Red Carrobean
Pseudomorus Brunoniana	Waddy Wood Ragwood (Imbil)	White Handlewood
Aphananthe Philippinensis	Prickly Fig (Benarkin) Axehandlewood (Imbil)	Grey Handlewood
Elæocarpus Eumundi	Eumundi (Fraser Island)	White Ooline
Emmenospermum alphitonioides	Yellow Ash (Imbil)	Pink Ooline
Rhodamnia trinervia	Scrub Stringybark Scrub Turpentine (N.S.W. and Queensland)	Brown Malletbox
Rhodamnia argentea	White Myrtle Freewood Grey Myrtle (Imbil)	Brown Malletbox
Rhodamnia acuminata	Myrtle	Brown Malletbox
Diploglottis Cunninghamii	Native Tamarind	Pink Tamarind

QUEENSLAND FOREST SERVICE INDEX COLLECTION OF TIMBER WITH COMMON NAMES AND ADOPTED OFFICIAL VERNACULARS—*continued.*

Botanical Identity.	Present Vernacular.	Official Vernacular.
Nephelium Lauterianum ..	Mackay Maple	Blush Tamarind
	Fraser Island Tamarind	
Cupania pseudorhus ..	Fern Tree	Pink Tamarind
	Pink Foambark (Imbil)	
Cupania xylocarpa ..	White Foambark (Imbil) ..	White Tamarind
Cupania anacardioides ..	Tuckeroo	Rose Tamarind
Cupania serrata	..	White Tamarind
Cupania semiglaucum ..	..	White Olivewood
Amoora nitidula ..	Incense Wood (Imbil) ..	Rose Kamala
	Jimmy Jimmy	
	Bog Onion (N.S.W.)	
Baloghia lucida	Scrub Bloodwood (Imbil)..	White Kamala
	Brush Bloodwood (N.S.W.)	
Mallotus Philippinensis ..	Kamala (Imbil)	Pink Kamala
Marlea vitiensis var. tomentosa	Black Heart (Imbil) ..	Black Muskheart
	Ebony (Imbil)	
Tarrietia argyrodendron ..	Crow's Foot Elm	Brown Tulip Oak
	Booyong	
	Stavewood	
	Hickory	
	Ironwood Ash Meganti	
Tarrietia macrophylla ..	Crow's Foot Elm	Blush Tulip Oak
Tarrietia actinophylla ..	Black Jack (S. Q'land) ..	Blush Tulip Oak
	Stavewood and Ironwood (N.S.W.)	
Tarrietia peralata	Red Crow's Foot Elm (N. Queensland)	Red Tulip Oak
	Atherton Red Oak	
Angophora lanceolata ..	Rusty Gum	Brown Applegum
	Red Gum	
	Sugar or Cabbage Gum	
Eucalyptus trachyphloia ..	White, Yellow, or Bastard Bloodwood	Brown Bloodwood
Eucalyptus peltata ..	..	Brown Bloodwood
Eucalyptus corymbosa ..	Red Bloodwood	Red Bloodwood
Eucalyptus Planchoniana	Planchon's Stringybark (Sunnybank)	White Messmate
	Bastard Tallowwood (N.S.W.)	
Eucalyptus Cloeziana ..	Gympie Messmate ..	Yellow Messmate
	Dead Finish (N. Q'land)	
Eucalyptus resinifera ..	Red Stringybark	Red Messmate
	Jimmy Low (Queensland)	
	Red Mahogany (N.S.W.)	
	Forest Mahogany (N.S.W.)	
Eucalyptus pellita ..	Red Stringybark	Red Messmate
Eucalyptus pilularis ..	Blackbutt (N.S.W. and Queensland)	Grey Blackbutt
	Great Blackbutt (N.S.W.)	
Eucalyptus eugenioides ..	White Stringybark (Queensland and N.S.W.)	Pink Blackbutt
Eucalyptus robusta ..	Swamp Mahogany (N.S.W.)	Red Blackbutt
	Robusta (Fraser Island)	
Diospyros pentamera ..	Black Myrtle (Benarkin) ..	Grey Calamanderwood
	Persimmon Wood	
Maba fasciculosa –.. ..	Black Ebony (Imbil) ..	Grey Calamanderwood
Casuarina torulosa ..	Forest Oak	Rose She Oak
	Red Oak	
Casuarina Cunninghamiana	River or Creek Oak (Imbil)	Brown She Oak
	River or White Oak (N.S.W.)	
Casuarina Luchmanni ..	Bull Oak (Dalby) (N.S.W.)	Red She Oak
Casuarina inophloia ..	Stringybark Oak (Dalby)..	Threaded She Oak

QUEENSLAND FOREST SERVICE INDEX COLLECTION OF TIMBER WITH COMMON NAMES AND ADOPTED OFFICIAL VERNACULARS—*continued.*

Botanical Identity.	Present Vernacular.	Official Vernacular.
Pleiogynium Solandri ..	Burdekin Plum (Rockhampton) Sour Plum	Tulip Plum
Owenia cepiodora ..	Onionwood (Yandina) ..	Rose Almond
Owenia venosa	Rose Apple (Yarraman) ..	Rose Almond
Calophyllum costatum ..	Calophyllum (Cairns) ..	Satin Poonwood
Avicennia officinalis ..	Grey or White Mangrove ..	Grey Mangrove
Callistemon viminalis ..	Red Bottlebrush ..	Red Bottlebrush
Weinmannia lachnocarpa ..	Marara (S.Q.)	Rose Marara
Exæcaria Dallachyana ..	Milkwood	White Marara
Alstonia villosa	"Blind your Eyes" ..	White Marara
Heimieyelia australasica ..	Grey Birch (Imbil) ..	Grey Marara
Capparis Mitchellii ..	Wild Orange	Buff Orangewood
Capparis nobilis	Wild Orange	White Orangewood
	Black Thorn	
Olea paniculata	Wild Olive (Imbil) ..	Olive Cornelwood
Alphitonia excelsa ..	Red Ash (Imbil) ..	Red Cornelwood
	Leather Jacket	
	Cooper's Wood (N.S.W.)	
	Humbug (Illawarra Dist.)	
Citrus australis	Lime	White Cornelwood
	Wild Lemon	
Citrus australasica ..	Finger Lime	White Cornelwood
Acronychia melicopioides ..	..	White Cornelwood
Nephelium distyle ..	..	Silver Cornelwood
Acacia doratoxylon ..	Mulga	Mulga Lancewood
Albizzia basaltica ..	Dead Finish (W. Q'land) ..	Red Lancewood
Harpullia pendula ..	Tulip	Tulip Lancewood
Guettarda putaminosa ..	..	Yellow Lancewood
Eucalyptus umbra ..	Yellow Stringybark (Fraser Island)	Yellow Stringybark
Eucalyptus acmenioides ..	Yellow Stringybark (Q'land) White Mahogany (N.S.W.)	Yellow Stringybark
Endiandra compressa ..	White Bark (Imbil) ..	Queensland Greenheart
	Golden Birch	
Vitex lignum vitæ ..	Lignum Vitae	Satin Hollywood
	Black Heart	
	Golden Box	
Pittosporum rhombifolium	White Holly	White Hollywood
	Inkberry (Imbil) ..	
Syncarpia Hillii	Fraser Island Turpentine ..	Red Satinay
Syncarpia laurifolia ..	Turpentine (S. Q'land) ..	Turpentine
	Turpentine Tree (N.S.W.)	
	Red Turpentine (N.S.W.)	
Tristania conferta ..	Brush Box (N.S.W.) ..	Brush Box
	Scrub Box	
	Brisbane Box	
Tristania suaveolens ..	Swamp Mahogany (Q'land)	Swamp Box
	Swamp Turpentine (N.S.W.)	
Tristania laurina	Kanuka (Queensland) ..	Water Box
	Water Gum (Q. and N.S.W.)	
Syncarpia subargentea ..	Scrub Ironwood (Imbil) ..	Ironwood Box
Eremophila Mitchelli ..	Sandalwood (W. Q'land) ..	Sandal Box
	Budda (N.S.W.)	
Randia chartacea ..	Sour Leaf	White Papajarin
	Mock Loquat	
	Jasmine	
Canthium latifolium ..	..	Brown Papajarin
Siphonodon australe ..	Ivorywood	Ivorywood
	Wild Guava	
	Floor Wood	
Scolopia Brownii ..	..	Pink Pearwood

QUEENSLAND FOREST SERVICE INDEX COLLECTION OF TIMBER WITH COMMON NAMES AND ADOPTED OFFICIAL VERNACULARS—*continued.*

Botanical Identity.	Present Vernacular.	Official Vernacular.
Hodgkinsonia ovatiflora ..	Mock Olive (Yarraman) ..	Brown Boxwood
Strychnos arborea ..	Needle and Thread Wood	Threaded Boxwood
	Sago Wood	
Lucuma sericea	Silky Hornbeam	Brown Boxwood
Chrysophyllum proiniferum	..	Pink Boxwood
Sideroxylon Pohlmanianum	Engravers' Wood (Imbil) ..	Yellow Boxwood
Lysicarpus ternifolius ..	Budgeroo	Mountain Myrtle
	Tom Russell's Mahogany	
	Mountain Oak	
Myrtus Hillii	Ironwood (Imbil) ..	Ironwood Myrtle
Drymophlæus Normanbyi ..	Black Palm (Cooktown) ..	Black Palm
Davidsonia pruriens ..	Davidsonian Plum (N. Q.)	Purple Bulletwood
Dissiliaria baloghioides ..	Red Heart (Imbil) ..	Red Bulletwood
	Howah	
Petalostigma quadriloculare	Quinine Berry ..	Brown Bulletwood
	Wild Quinine	
Sideroxylon myrsinioides ..	..	White Bulletwood
Sideroxylon australis ..	Black Apple	Silver Bulletwood
	Native Plum	
Erythrophlœum Laboucherii	Leguminous Ironbark ..	Red Cocobolo
	Cooktown Ironbark	
Eucalyptus melliodora ..	Yellow Box (N.S.W. and Dalby)	Yellow Ironbox
	Yellow Jacket (West N.S.W.)	
Acacia falcata	..	Rose Spearwood
Acacia excelsa	Ironwood Wattle (Dalby)	Iron Spearwood
Acacia harpophylla ..	Brigalow (W. Queensland)	Brigalow Spearwood
Acacia Cambagei	Gidyea	Gidya Spearwood
	Gidya (W. Queensland)	
Acacia rhodoxylon ..	Rosewood (Dalby) ..	Brown Spearwood
Bauhinia Hookeri	Mountain Ebony (Central Queensland)	Brown Pegunny
Bauhinia Carroni	..	Brown Pegunny
Eucalyptus tereticornis ..	Blue Gum (Queensland) ..	Red Irongum
	Forest Red Gum (N.S.W.)	
Eucalyptus propinqua ..	Grey Gum	Grey Irongum
	Small Fruited Grey Gum	
Eucalyptus punctata ..	Grey Gum	Grey Irongum
Eucalyptus maculata ..	Spotted Gum	Spotted Irongum
	Mottled Gum (N.S.W.) ..	
Eucalyptus citriodora ..	Citron Scented Gum (Rockhampton)	Lemon Irongum
Eucalyptus paniculata ..	Grey Ironbark	Grey Ironbark
	White Ironbark (N.S.W.)	
Eucalyptus sideroxylon ..	Red Ironbark (N.S.W. and Queensland)	Red Ironbark
Eucalyptus siderophloia ..	Broad-leafed Ironbark (Brisbane and N.S.W.)	Red Ironbark
	Red Ironbark (N.S.W. and Queensland)	
Eucalyptus melanophloia ..	Silver Leafed Ironbark ..	Silver Leafed Ironbark
Eucalyptus microcorys ..	Tallowwood (Q'land) ..	Tallowwood
	Turpentine (Brisbane)	
Halfordia scleroxyla ..	Ghittoe (Atherton) ..	Saffronheart
Halfordia drupifera ..	Kerosene Wood (Fraser Is.)	Saffronheart
Maba humilis	Black Ebony (N. Q'land) ..	Queensland Ebony
Callistemon salignus ..	Willow Tea Tree ..	Brown Teawood
Geijera Muelleri ..	Green Heart	Green Satinheart
	Axe Gapper	
Geijera salicifolia	Green Heart	Green Satinheart

SOME FACTORS THAT DETERMINE THE KEEPING QUALITY OF STORED MAIZE.

By F. F. COLEMAN, Officer in Charge, Seeds, Fertilisers, and Stock Foods Investigation Branch.

In 1923 a number of samples, representing maize then being imported from South Africa, were submitted for examination by the leading produce merchants.

The method of examination then adopted was to ascertain—

1. Weight of 1 litre in grammes.
2. Percentage of moisture.
3. Percentage of grain of the type to which the sample purported to belong.
4. Percentage of coloured grain.
5. Total percentage of commercial grain.
6. Percentage of damaged grain.
7. Percentage of foreign material.

At the time it was noted that most of the consignments consisted of Flint Maize, with a heavy volume weight. As this type is not usually grown in Queensland, no comparison can be made. Some of the samples of Yellow Dent, with more or less the characteristics of Queensland produce, were examined with the results as set out in Table A.

TABLE A.

YELLOW DENT MAIZE FROM SOUTH AFRICA (1923).

Sample No.	Litre Weight in Grammes.	Percentage of Moisture.	Percentage of Yellow Dent.	Percentage of Coloured Grain.	Total Percentage of Commercial Grain.	Percentage of Damaged Grain.	Percentage of Foreign Material.
74	710	14·6	95·959	2·166	98·125	1·715	·16
77	750	14·6	99·015	·415	99·43	None	·57
78	730	14·0	96·39	1·23	97·62	1·78	·6
80	722	12·7	94·189	·97	95·159	4·02	·821
96	726	12·4	93·76	4·62	98·38	·95	·67
97	761	14·0	95·61	2·295	97·905	1·57	·525
99	729	13·8	95·297	1·903	97·2	2·1	·7
100	743	14·0	93·472	4·505	97·977	1·64	·383
104	717	15·4	97·987	1·17	99·157	·583	·26
107	722	14·4	96·15	2·3	98·45	1·43	·12
138	702	11·6	95·49	None	95·49	3·23	1·28
139	705	11·0	93·75	2·74	96·49	2·61	·9
153	680	12·0	96·606	1·06	97·666	2·01	·324
154	701	12·0	98·497	·7	99·197	·4	·403
Average	721	13·3	..	..	97·731	1·717	·551

A portion of each of the samples was kept in air-tight glass jars; after a few months storage it was evident that factors other than the moisture content determined the keeping quality. All the samples put in the glass containers were free from external insects, and were such samples as would have then been accepted by the produce trade as free from weevils. The question therefore arose as to what methods, if any, that could be adopted, which, while not taking up too much time in the actual work of examination, would give results sufficient to indicate to the buyer, with some degree of accuracy, the samples' probable keeping quality.

Experiments in this direction had to be held over until the present laboratory was finished. With the heavy maize crop of 1924 we were able to obtain samples representing bulks from the principal South Queensland maize-growing areas, and a series of small experiments were made. It was soon evident that a low moisture content often indicated a low volume weight, with a large percentage of damaged grain.

In January, 1925, a more or less satisfactory method for the examination of the interior of the grain, to ascertain the number of insects in developmental stages had been worked out.

For the purpose of putting this tentative method to a test, fourteen samples representing South Queensland maize then offered for sale as suitable for export were examined in January with the results as shown in Table B. A portion of each sample was put into a glass jar closed with a screw-down lid; these containers were opened in February, April, and July, the condition of the sample then being as set out in the three columns on the right-hand side of Table B.

The remainder of each sample was treated in the following manner:—

1. Put in a screw-down glass jar with paradichlor. at the rate of 0·5 of a gramme to 1,000 c.c.
2. Dried for three hours at 50 degrees C, and then stored in a screw-down glass jar.
3. Fumigated for twenty-four hours with carbon bisulphide at the rate of 2 lb. per 1,000 cubic feet, and then stored in a screw-down glass jar.

In July and October the paradichlor. and dried samples were examined; all insects were dead, otherwise the condition of each sample was the same as when received in January.

In August the fourteen samples of maize fumigated with bisulphide of carbon for twenty-four hours at the rate of 2 lb. per 1,000 cubic feet were examined, with the results that ten were found to have kept well and free from live insects, four samples, however, were badly insect-infested. The four samples in question were fumigated in a bin fitted with a lid that would, in a produce merchant's warehouse, be accepted as air-tight. A careful examination of the bin revealed three small holes in the bottom, each less than one-sixteenth of an inch in diameter. After another experiment with the same bin it was definitely proved that the three small small perforations were the cause of the failure.

It is, therefore, obvious that under ordinary commercial conditions 2 lb. per 1,000 cubic feet would give a fair measure of protection, but could not be relied on to give a 100 per cent. kill.

Further experiments during the cold months of June and July with badly insect-infested maize proved that with temperatures below 65 degrees F, the effectiveness of fumigation by bisulphide of carbon, at the rate of 2 lb. per 1,000 cubic feet, was far less than the January experiments indicated.

The actual air space in a tank filled with maize is approximately 40 per cent. of the container's cubic capacity. Assuming our storage bin has a capacity of 1,000 cubic feet, it would hold nearly 20 tons of maize and 400 cubic feet of air.

TABLE B.

SAMPLES OF SOUTH QUEENSLAND MAIZE OFFERED FOR SALE AT BRISBANE DURING JANUARY, 1925.

Sample No.	Weight of 1 Litre in Grammes.	Percentage by Weight of Moisture.	Percentage by Weight of Apparently Good Commercial Grain.	Percentage by Weight of Damaged Grain.	Percentage by Weight of — Material that will pass 14/64 Sieve.	Percentage by Weight of — Material other than Maize that will not pass 14/64 Sieve.	Average Number of Live Weevils in one Pound of Sample	Interior Examination. Number of Insects in developmental stages found in one hundred kernels of the apparently good commercial grain.	Condition of Sample in— February. Sample Merchantable as—	Condition of Sample in— April. Sample Merchantable as—	Condition of Sample in— July. Sample Merchantable as—
498 ..	739·0	12·6	99·63	·28	·09	None	None	None	Sound	Sound	Sound
500 ..	729·8	13·6	98·57	·66	·77	None	Slight trace*	None	Sound	Sound	Slightly insect infested
486 ..	731·0	12·4	98·38	1·41	·21	None	4	10	Slightly insect infested	Insect infested	Badly insect infested
488 ..	736·8	12·3	98·41	1·44	·15	None	4	5	ditto	ditto	ditto
493 ..	701·3	13·2	98·14	1·27	·25	·34	None	9	Free from external insects	ditto	ditto
497 ..	725·8	13·1	99·4	·32	·28	None	4	7	Slightly insect infested	ditto	ditto
499 ..	747·4	14·6	99·15	·24	·61	None	None	12	Free from external insects	ditto	ditto
487 ..	710·9	12·8	96·38	3·51	·11	None	5	10	Slightly insect infested	Badly insect infested	Sample unsaleable
489 ..	727·7	14·0	96·55	3·08	·37	None	4	8	ditto	ditto	ditto
490 ..	712·3	13·7	96·49	3·10	·41	None	None	7	Free from external insects	ditto	ditto
492 ..	730·5	14·4	95·86	3·02	1·12	None	None	21	ditto	ditto	ditto
494 ..	709·4	13·9	98·76	·75	·42	·07	None	12	ditto	ditto	ditto
495 ..	705·7	12·7	98·43	1·27	·3	None	5	21	Slightly insect infested	ditto	ditto
496 ..	688·6	12·4	94·85	4·55	·6	None	14	11	Insect infested	Sample unsaleable	..
Average	721·1	13·2	97·78	7·77	..	..	..	..	..	..	..

* One live weevil found in 4 lb.

In actual commercial use it is doubtful if the user of bisulphide of carbon would have an absolutely air-tight container. The question, therefore, arises as to what concentration is necessary to give under ordinary working conditions a 100 per cent. kill in twenty-four hours.

Repeated experiments during September and October on maize that was badly insect-infested has proved that three pints (4½ lb.) of bisulphide of carbon applied to a full tank of 1,000 cubic feet capacity will give a maximum kill in twenty-four hours. If the grain remains longer in the container it may have an objectionable odour. After fumigation and before the grain is offered for sale, it should be put through an efficient cleaning machine to remove the dead insects. In all cases it is advisable to store maize in a container other than that in which it was fumigated. Further, it must not be overlooked that when the fumes of bisulphide of carbon are present in the fumigation chamber for a longer period than is absolutely necessary to kill the insects, the germination of the grain may be adversely affected. With grain stored for any length of time, the loss of germination from this cause will be particularly noticeable; when bisulphide of carbon is used in the manner recommended this loss will not occur. Owing to bisulphide of carbon, even in moderate concentration, being poisonous to man, its disagreeable odour, and danger of explosion when its vapour mixed with air is brought near a naked light, has caused many inquiries for a fumigant free from fire risks yet equally effective in killing power, with the result that attention has been directed to the use of ethyl acetate and carbon tetrachloride. In the U.S.A. this has been tried on wheat in railway box-trucks, using 40 volumes of ethyl acetate and 60 volumes of carbon tetrachloride at the rate of 45 lb. to 1,000 cubic feet.

Our experiments with these materials on maize are as set out in Table C, from which it will be noted that even at a greater concentration it failed to kill all the insects in the grain. If effective its present cost would be against its use; further, some of the grain after treatment had an unpleasant taste, which is also the chief objection to the use of paradichlor. in grain to be used for feeding purposes.

In theory carbon dioxide should kill all insects, yet experiments carried out in conjunction with the Agricultural Chemist, Mr. J. C. Brünnich, failed to kill the insects, in spite of the fact that a far greater concentration was used than would be possible under ordinary commercial conditions.

It is interesting to note that Barnes and Grove, in Vol. IV., No. 6, Chemical Series (Memoirs of the Department of Agriculture of India) under date of November, 1916, state that they were forced to the conclusion that no inert gas (such as carbon dioxide) can be economically used as an asphyxiating agent. Further, they found that as it affects the germinating power of wheat, they could only recommend the use of chemical deterrents or mechanical methods of treatment.

A series of experiments with a lighted candle in an air-tight container, also with carbon dioxide, proved the futility of these methods for the destruction of insects in stored maize.

Reference has already been made to the good keeping quality of maize that had been dried for three hours at a temperature of 50 degrees C (122 degrees F), the loss of weight at this temperature is reduced to a minimum, but the period of drying is too long for it to at present be a commercial success. Table D gives some experiments in drying at different temperatures. It is evident that time is required for the heat to reach the insects in developmental stages inside the grain.

TABLE C.

RESULTS OF FUMIGATION TESTS WITH ETHYL ACETATE, CARBON TETRACHLORIDE, PARADICHLOR., AND BISULPHIDE OF CARBON.

Fumigant.	Concentration of Fumigant per 1,000 cub. ft. of Chamber Space.	Duration of Fumigation.	Remarks on Insects at end of Fumigation.	Condition of Bulk at End of—	
				Two Months.	Three Months.
Forty volumes of Ethyl Acetate and fifty volumes of Carbon Tetrachloride	45 lb.	24 hours	Some killed, many alive	Insect infested	Unsaleable
Ditto	50 lb.	24 hours	Some killed, many alive	Insect infested	Unsaleable
Ditto	100 lb.	24 hours	Many killed, few alive	Insect infested	Badly insect infested
Ditto	50 lb.	48 hours	Many killed, few alive	Insect infested	Unsaleable
Bisulphide of Carbon	4½ lb. (3 pints)	24 hours	Dead	Insects dead, otherwise grain in same condition as when experiment started	Insects dead, otherwise grain in same condition as when experiment started
* Paradichlor.	10 lb.	Three months	Dead	Insects dead, otherwise grain in same condition as when experiment started	Insects dead, otherwise grain in same condition as when experiment started

* Grain after treatment with paradichlor. has an unpleasant taste and is therefore unsuitable for feeding to stock.

TABLE D.

RESULTS OF EXPERIMENTS IN THE DRYING OF INSECT-INFESTED MAIZE AT DIFFERENT TEMPERATURES.

Dried for—	½ hour at 57-60° C.	¾ hour at 58-59° C.	1 hour at 60° C.	1¼ hour at 58-60° C.	1½ hour at 60-61° C.	2 hours at 58-60° C.	2½ hours at 59-60° C.	3 hours at 60° C.
Remarks on insects at end of time dried	Alive ..	Alive ..	Alive ..	Alive ..	Alive	Alive	Trace of live insects, many dead	Dead
Condition of grain after two months storage	Unsaleable ..	Unsaleable ..	Unsaleable ..	Unsaleable ..	Unsaleable	Insect infested ..	Slightly insect infested	Insects dead, otherwise grain in same condition as when experiment started

Dried for—	18 min. at 77-80° C.	24 min. at 79-80° C.	30 min. at 80-82° C.	42 min. at 81-79° C.	54 min. at 75-81° C.	66 min. at 78-83° C.	78 min. at 78-83° C.	90 min. at 79-80° C.
Remarks on insects at end of time dried	Alive ..	Alive ..	Alive ..	Dead ..	Dead	Dead	Dead	Dead .. ..
Condition of grain after five months storage	Unsaleable ..	Unsaleable ..	Unsaleable ..	Insect infested	Insects dead, otherwise grain in same condition as when experiment started	Insects dead, otherwise grain in same condition as when experiment started	Insects dead, otherwise grain in same condition as when experiment started	Insects dead, otherwise grain in same condition as when experiment started

The temperatures given in this table are expressed in Centigrade. 60° C equals 140° Fahrenheit, 80° C equals 176° Fahrenheit.

Provided maize is free from insects inside the grain, it is evident from repeated experiments that a sample's resistance to insect attack has a relation to its degree of hardness. Samples dried for even a few hours at 40 degrees C usually keep in a merchantable condition for a longer period than the undried. This is borne out by the following small experiments:—In February, after drying 100 grains of sound maize at 39 degrees C for eighteen hours, forty live Calandra Oryzae were placed inside a jar containing the dried maize, the jar being covered with a piece of thin cloth. The adult insects were removed at intervals of a month; by November the total so removed had reached forty-nine. As a control the same number of weevils were placed in a jar containing 100 grains from the undried portion of the sample. At the same date in November a total of 137 had been removed, representing an increase of 97 in the maize as received, against an increase of 9 from the slightly dried maize.

It has further been observed that insect attack is far less on the flint-like grain usually found at the top and bottom of cobs than on the remainder of the grain. In all sub-tropical and tropical countries an immense loss is experienced each year by the working of the Rice Weevil (Calandra Oryzae) in stored maize, wheat, sorghum, &c.

This pest is often present in such numbers as to render it possible to collect kerosene tins full of the insects. When this has been done it is imperative that they be killed by boiling water or by fumigation with bisulphide of carbon. The pouring of cold water on the insects is useless, as the following small experiment will prove:—

In October 200 C. Oryzae were submerged in water for twenty-four hours and then put on filter paper in a petri dish. Within a few hours 170 had crawled under the filter paper, eighteen were dead, and twelve missing.

The live insects were then submerged for eight days; after being put on filter paper 113 crawled away, 51 were dead, and the remainder missing.

As far back as 1903 Mr. W. W. Froggatt, writing on insects that damage wheat or other foodstuffs, stated as a well-known fact that if clean grain be placed in a salt-bag no weevil will infest it. Since then it is understood that a process for the treating of bags with a saline solution has been patented by a resident of the Ayr district. From Table E it will be noted that the storage of maize in bags treated with a saline solution did not kill the insects in the grain or prevent them from breeding. It will, however, be observed that the use of treated bags, and double bags, gave a certain amount of protection from outside attack. Still we cannot overlook the fact that the only sample that retained its condition after five months' storage was the one fumigated with bisulphide of carbon, and stored in an air-tight insect-proof container.

In course of these experiments the bags of maize were stored in a rat and weevil infested shed; none of the salt-bags were attacked by rats. Easy access to untreated bags may have caused this; anyway, their dislike for the treated bags may be of some commercial value. Absolute immunity, however, could only be given by the storage of fumigated grain in a clean, dry, air-tight, and rat-proof container, and then only when the average moisture content of the grain was less than 14 per cent.

During the last few months several samples representing maize tanked during 1924 were submitted for examination. After more than a year has elapsed it is somewhat difficult to get full details of storage;

TABLE E.

EXPERIMENT IN THE STORAGE OF INSECT-INFESTED MAIZE IN AIR-TIGHT TANKS, DOUBLE BAGS, AND BAGS TREATED WITH A SALINE SOLUTION.

Fumigant.	Concentration of Fumigant per 1,000 cub. ft. of Chamber Space.	Duration of Fumigation.	Method of Storage.	Condition of Grain after Five Months' Storage.		
				Litre Weight in Grammes	Percentage of Sound Grain.	Condition of Bulk.
Bisulphide of Carbon ..	4½ lb. (3 pints)	48 hours	Air-tight tank	689·3	67·1	Insects dead, otherwise grain in same condition as when experiment started
Ditto	4½ lb. (3 pints)	48 hours	Bag treated with a saline solution ..	644·3	42·7	Insect infested
Ditto	4½ lb. (3 pints)	48 hours	Double bags, untreated	625·1	42·2	ditto
Ditto	4½ lb. (3 pints)	48 hours	Untreated bag	642·3	38·0	ditto
Nil	..	..	Bag treated with a saline solution ..	629·8	33·8	ditto
Nil	..	..	Grain sifted over a ¼-inch sieve, then put into a bag treated with a saline solution	605·3	27·0	ditto
Nil	..	..	Untreated bag	592·8	23·8	Badly insect infested

The above experiment was commenced during the third week of October, 1925, the condition of the Maize at the time being—Litre weight in grammes, 690·2; percentage of sound grain, 68; condition of bulk, insect infested.

it was, however, ascertained that two samples represented maize stored without any treatment, and three represented grain that had been fumigated and kept in specially constructed air-tight tanks. On a careful examination of the samples being made it was found that the samples of untreated maize were free from any trace of insect attack, therefore sound at time of storage. They had a slightly musty smell, probably caused by storage in tanks that had not been thoroughly cleaned out.

The samples representing bulks that had been treated with bisulphide of carbon were on dissection found to show traces of insects in developmental stages, which, however, had been killed in 1924 by fumigation. The maize was of good commercial quality, free from live insects, and sold at the highest ruling prices.

The actual difference in market value between good commercial grain and weevily samples may only be 3d. per bushel of 56 lb. or 10s. per ton, yet cases are on record of badly damaged samples that had lost over 20 per cent. of their original weight.

Two samples recently examined contained more than one-third of insect-damaged grain. The bulks in question would require over 110 bags to equal in weight 100 bags of the grain in its original condition. This involves double loss to the farmer without any advantage to the merchant handling the produce, besides being detrimental to the interests of the user.

Repeated experiments with grain in bulk have proved that when it is free from external insects, and from insects in developmental stages inside the grain, it can be kept indefinitely, provided it is not brought into contact with infestation of some kind such as may, more or less, always exist in barns, warehouses, or places where insect-infested grain has previously been stored.

Carbon bisulphide has been proved thoroughly effective and cheap in application. Provided the proper course is adopted there will be no retention of smell when the grain is subsequently marketed. The quantity recommended for maize is 3 pints (4½ lb.) per thousand cubic feet, it being always remembered that the quantity to be used has a relation to the cubic content of the container, which should be full of grain.

The insects infesting cow peas, beans, and sorghums can be killed in the same manner, the quantity, however, being reduced to 2 pints (3 lb.) per thousand cubic feet.

Insect-infested samples, and maize affected by *Diplodia Zeæ* (Ear Rot) are usually associated with a light volume weight, and in some cases with a low moisture content. On reference to Table B it will be observed that the average volume weight of a litre is given as 721 grammes, which is just under 58 lb. per imperial bushel. When the volume weight falls below 700 grammes (56 lb. per imperial bushel) it is a distinct indication of poor quality.

For the information of merchants and others sending maize samples to this branch of the Department of Agriculture it should be noted that samples should not be of less weight than 7 lb., care being taken to see that each sample is truly representative of the bulk.

Each sample should be marked in ink giving the following particulars:—

Quantity sample represents.
Date of sampling.
Full name and address of sender.

After examination the following particulars will be given:—

Volume weight of one litre.
Moisture content.
Percentage of apparently sound commercial grain.
Percentage of material other than maize.
Percentage of damaged grain.
Average number of live insects in 1 lb. of the sample (this does not include insects inside the grain).
The average number of live insects in developmental stages (found by dissection) inside 100 of the apparently sound kernels.

The fee payable by any produce merchant or other dealer for an examination of a maize sample will be one guinea, with a reduction when two or more samples are sent in at the same time.

EXPERIMENTAL WORK AT CHARTERS TOWERS.

The Director of Agriculture, Mr. H. C. Quodling, has received the following report from Mr. N. A. R. Pollock, Northern Instructor in Agriculture, Townsville:—

A visit was made to Charters Towers in connection with the experimental and demonstration work in summer green feeds, and to arrange similar work with winter green feeds.

In approaching Charters Towers by train from Townsville, the diminution of the rainfall was noted from Ravenswood Junction in the quantity and quality of the pasturage, which became drier and scantier as the town is approached.

Since my last visit in early February when 2 inches of rain were recorded, there have only been a total of 36 points to date.

The few farmers who made any sowings met with failure, and with the exception of one (Messrs. Dutton and Watson, who got a little more rain than the others) there is not a farm with any crop showing.

On all farms the ground is ploughed in anticipation of rain, of which there is no present prospect.

Where irrigation is practised, sowing for winter crops can be carried on. The uncertain nature of the winter rains, however, clearly shows that the farmer should concentrate on the growth of summer crops, ensiling or drying these to carry him through the year.

Stock on Relief Country.

Stockowners are feeling the pinch and are casting about for relief country. Owners often at some distance from the rails have hung on in anticipation of rain, to find that their sheep are too poor to travel; others have railed and are railing their sheep to relief country in the Gulf districts and to the Eastern coast. At Reid River, which I visited on my return, agistment had been secured for something over 40,000 sheep which were then arriving; the loss by death during transit in one train was 5 per cent. Other trainloads of sheep are passing through for other coastal districts as far south as Mackay. These, I understand, are mainly wethers which will be distributed among sugar farmers and sold as soon as they fatten, the agreement being that the owner and farmer share equally in the value realised above 10s. per head.

At Cardington and Reid River grass and water were plentiful owing to the nice rains that had fallen. Crops of Sudan grass, velvet beans, and cow peas looked very well at Cardington, while at Reid River honey sorghum had won golden opinions.

PLATE 125.—SYDNEY SHOW CHAMPIONS.

These Poland-Chinas were all prize winners at the recent Sydney Show, the two, boar and sow, on the right, winning championships in keenly contested classes. The Poland-China has many very valuable qualities. It is a breed worth knowing, for they can be used to advantage both in the pure bred state and for crossbreeding for the production of pork and bacon. The Tamworth-Poland-China cross is an ideal type of animal.

PLATE 126.—PIGS FOR PROFIT.

The first prize winners in the Middle Yorkshire Sow and Litter Class at the recent Sydney Show. The class was keenly contested, several excellent quality litters being penned. Some of this description, capable of producing large thrifty litters, justify the claim that there is "Money in Pigs." The litter, twelve in number, was shown in ideal condition, while the sow had been able to hold her own condition whilst suckling them.

THE CONSTRUCTION OF STIES AND PROVISION OF PADDOCK ACCOMMODATION FOR PIGS.

E. J. SHELTON, H.D.A., Instructor in Pig Raising.

This is the third of a series of articles dealing with the Construction of Pig Sties. The first and second of the series appeared in the February and April issues, respectively, and are now available gratis in pamphlet form.

The accompanying photographs illustrate an up-to-date "Commercial" Piggery with neat, useful, and attractive buildings. It is used principally as a fattening depôt for pigs fed on buttermilk (with the addition of some grain concentrate) secured on contract from the Boonah Butter Factory. This piggery was until recently owned by the late Mr. Fred Knuth, of Boonah.

It appeals as an ideal type of fattening depôt, a type of building to be recommended especially where buttermilk forms the principal portion of the liquid food. Plans of the building are available to anyone interested, and may be obtained on application to the Department of Agriculture and Stock, Brisbane. The main building (see Fig. 1) consists of one central fattening-house containing eight pens each 20 feet by 12 feet, with a 3 foot 6 inch passage through the centre. The building material required includes some thirty-six round upright posts, beams, cross-ties, and battens; the roof is of galvanised iron with ridge capping, spouting, &c. The pens are subdivided as required, the subdivision material being sawn hardwood rails and pickets (1½ inches apart) 3 feet 6 inches high. Wooden troughs have been used, for the owner found they were more satisfactory than concrete or brick and cement; they are 8 feet long by 12 or more inches across the top, and are made V-shaped. When placed in position under the subdivision rail facing the passage, there is just sufficient space allowed for the pigs to feed comfortably without standing or lying in the trough. The flooring is of bricks set in sand and top-dressed and grouted in with cement. This again has proved far more satisfactory than a concrete floor and has many other advantages apart from the convenience of handling in the first instance, principal among these advantages being that when and where required the floor can be repaired much more readily than in the case of a concrete floor. The brick floor is also much easier to clean; this is an important consideration where the water supply is limited.

For ordinary floor work, top-dressing and grouting, mix three parts clean, sharp sand with one part cement; make this into mortar of ordinary consistency, then to half a bucket of water add sufficient mortar to make the mixture thin enough to run freely into the joints between the bricks. It will be noticed that most builders prefer to have the bricks fairly wet before grouting. This would be done by the use of a watering-can using clean water; the objective of this is that the bricks already having absorbed some moisture will not absorb too much of the water from the grouting mixture before this has time to set. It is advisable to see that all the crevices between the bricks and especially in the corners are well filled with the grout before finally top-dressing with a mixture somewhat thicker than that already advised. If it is desired to make a specially good job of the floor use more cement, seeing in the first instance that the bricks are very firmly set in the sand.

In the piggery illustrated, the floor slopes outward from the centre of the building, and an open brick and cement drain outside conveys all waste water away from the buildings. Each pen is provided with a gateway, the gates being placed in such a position that they fill a useful part when pigs are being moved from one pen to another. The ridge pole is approximately 14 feet from ground level, the wall plates about 6 feet 6 inches.

Four thousand bricks were required in laying out the floor, drains, &c., and the builder estimated the cost of the buildings, tanks, &c., at £1,000, exclusive of cost of about one mile of 2-inch galvanised piping leading from the factory to the piggery; this latter was provided by the factory people. This may seem an expensive building, but when it is remembered that it provides accommodation for from 100 to 200 fattening pigs (according to size of pigs) and that it would be in use continuously year in year out for many years, the initial cost is not the only consideration.

PLATE 127 (Fig. 1).—PIG FATTENING DEPÔT, PROPERTY OF MR. FRED KNUTH, BOONAH.
A neat, attractive, and convenient building.

The buttermilk is conveyed for a distance of about one mile across rising ground ex the factory through 2-inch galvanised piping to the receiving tanks, and through 1½-inch piping ex the tanks to the pig troughs.

Very little trouble has been experienced with the 2-inch piping ex the factory to the receiving tanks, as it is regularly flushed out with 400 gallons of hot water immediately after the buttermilk supply to the pig tanks, and wash water to a field further on has been pumped through; but in the case of the 1½-inch pipes leading from the receiving tanks to the pig trough, and which frequently carry a supply of milk for many hours at a time, considerable trouble has resulted, and it is considered that the lifetime of these pipes is but five years. Fig. 2 illustrates a batch of these pipes after five years use; they were riddled with holes, the result of the action of the acid in the milk on the pipes.

The question arises as to whether concrete piping or wood pipe would be preferable. The writer urges the use of properly constructed wood pipe for this purpose in preference to galvanised piping, for it is considered that it would be more economical and much more satisfactory for the conveyance of the milk from the factory to the piggery. It is not easy to secure concrete piping of 2-inch or of less diameter.

At the time the photographs were taken, Mr. Fred Knuth was proprietor; he had been working the property for eighteen years and reported very little trouble with his pigs from contagious or other diseases or from heat apoplexy or minor troubles.

The milk storage tanks comprise two sets; one of galvanised iron with a 1½-inch concrete lining inside; the other set is of ordinary iron ship's tanks each of 400 gallons capacity. The large tank is used for the water supply; it also has a 1½-inch inside lining of concrete. A permanent and sufficient water supply is an absolute necessity. In the illustration will be seen the loading race leading from the central passage and per means of which the pigs are driven from the pens to the wagon for delivery to the pig truck.

The directors of the Logan and Albert Co-operative Dairy at Beaudesert, Queensland, have recently erected a fattening depôt on practically the same plan as that illustrated. They have made improvement wherever necessary, and they are quite convinced that from a butter factory and from a pig-fattening standpoint buildings of this description are not only a necessity but a good business proposition. Receiving and resting yards outside of these pens, as well as convenient pig paddocks and cultivation areas, are also necessities, as also is a good food store in which grain and meals (pollard, &c.) can be stored.

Construction of Pig Sties—The Legal Aspect.

Several inquiries have been made recently as to the legal aspect of pig-raising and the construction of pigsties, i.e., "As to whether a pig farmer must be registered in a manner similar to that under which the registration of dairies and of dairy farmers is arranged; also as to the required distance from the dairy, cream room, &c., of the piggeries." To these the following information applies:—

There is at present no specific Act of Parliament applying directly to the registration of pig-raisers except the Act under which dairy farmers who keep pigs as part of their farm stock, but who are classified as dairy farmers, not pig farmers, are registered.

Certain shire and municipal regulations also prohibit the keeping of pigs within town boundaries, &c.

Under "*The Dairy Produce Act of* 1920," certain specified conditions must be observed in regard to distance of piggery from dairy.

In this connection attention is drawn to the following regulations:—

Regulations Nos. 57, 60, 62, and 64 of "*The Dairy Produce Act of* 1920" provide that—

> Regulation No. 57.—"No swine shall be kept on or be permitted to be or to approach or to remain within 150 feet of any dairy produce premises wherein dairy produce is handled, kept, or stored."
>
> Regulation No. 60.—"Should the construction or situation of or material used in any piggery or stable or the other conditions under which swine or any other domestic animals are kept or enclosed on dairy produce premises, be in the opinion of an inspector detrimental to the quality of the dairy produce obtained on such premises, the owner of such premises shall forthwith make such alteration as such inspector may by notice in writing require."
>
> Regulation No. 62.—"No accumulation of manure shall be permitted within 130 feet of a dairy house or any place wherein milk or its products are kept or stored or within 100 feet of a milking shed."

PLATE 528 (Fig. 2).—MR. FRED KNUTH'S PROCKEY.
Note the effect of the boilermaker on the galvanised piping in the foreground. These pipes had been in use but five years when they had to be replaced with new piping.

Regulation No. 64.—"All drains on any dairy produce premises where stock or pigs are kept shall be of an impervious nature, and shall be so constructed as to be capable of being kept in a clean and wholesome condition, and shall be controlled and directed as may be required by an inspector."

"The Slaughtering Act of 1898."

The Regulations under "*The Slaughtering Act of* 1898" which have reference to pig farmers and to pigs read as follows:—

Regulation No. 26 (*b*).—"No person shall feed or cause to be fed at any slaughter-house any swine with any blood or offal, unless such blood or offal has been boiled, desiccated, or otherwise treated to the satisfaction of an inspector."

Regulation No. 26 (*c*).—"No person shall remove or cause to be removed any blood or offal from any slaughter-house unless it has been previously boiled, desiccated, or otherwise treated to the satisfaction of an inspector."

How Swine May be Kept.

Regulation No. 33.—"The owner or occupier of a slaughter-house shall not keep, or cause or allow to be kept, any swine at such slaughter-house unless such swine are kept in accordance with the following provisions:—

(*a*) Such swine shall be confined either in a sty or paddock enclosed by a sufficient fence to prevent their egress or ingress at any part thereof when the doors or gates thereof are closed; and such doors or gates shall be kept closed except when in actual use by some person for the purpose of egress or ingress.

(*b*) No part of any such sty or paddock shall be less than 80 yards from any part of such slaughter-house in or at which stock are slaughtered or meat is dressed, prepared, treated, stored, or exposed for sale or delivery.

(*c*) Each sty shall have a roof, or each paddock shall contain a shed with a roof, and such sty or shed shall be large enough to cover from the weather all the swine kept at such sty or in such paddock.

(*d*) Each paddock, feeding-place, sty, or shelter-shed shall be kept in a clean and sanitary condition to the satisfaction of an inspector.

(*e*) Each feeding-place, sty, or shelter-shed or paddock shall be provided with drains sufficient to carry off thoroughly all drainage therein.

(*f*) Swine shall not be fed upon any floor except a floor constructed of concrete or other material impervious to moisture.

(*g*) No swine shall be fed, either wholly or in part, upon the flesh or blood of any diseased carcass or upon any food that has been mixed with or contains or has been exposed to contamination by the flesh or blood of any diseased carcass, or upon the flesh of an animal that has died other than by slaughter."

Regulation 37, dealing with fees for inspection of carcasses at slaughter-houses, provides in the case of pigs as follows:—

"The fees payable by the owner or occupier of a slaughter-house for the purpose of defraying the expenses of inspection shall be as follows, that is to say—For every head of swine slaughtered, 3d."

Regulation No. 53—"The Keeping of Swine"—reads as follows:—

"The owner or occupier of a butcher's shop shall not keep, or cause or allow to be kept, any swine at such butcher's shop, unless such swine are kept in accordance with the following provisions:—

(*a*) Such swine shall be confined either in a sty or paddock enclosed by a sufficient fence to prevent their egress or ingress at any part thereof when the doors or gates thereat are closed, and such doors or gates shall be kept closed except when in actual use by persons for the purpose of egress or ingress.

(*b*) No part of any sty or paddock shall be less than 80 yards from any part of such butcher's shop.

(*c*) Each sty shall have a roof, and each paddock in which swine are confined shall contain a shed with a roof; and such sty or shed shall be large enough to cover from the weather all the swine in such paddock or kept at such sty.

(*d*) Each paddock, feeding-place, sty, or shelter-shed shall be kept in a clean and sanitary condition.

(*e*) Each feeding-place, sty, or shelter-shed shall be provided with drains sufficient to carry off thoroughly all drainage therein.

(*f*) Swine shall not be fed upon any place except a place constructed of concrete or other material impervious to water and constructed upon a solid foundation.

(*g*) No swine shall be fed upon the flesh or blood of any diseased animal, or upon any food that has been mixed with or contains or has been exposed to contamination by flesh or blood of any diseased animal that has died other than by slaughter."

Copies of "*The Dairy Produce Act of* 1920" and "*The Slaughtering Act of* 1898," and any other information, may be obtained on application to the Under Secretary, Department of Agriculture and Stock, Brisbane.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF MARCH, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING MARCH, 1926 AND 1925, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Mar.	No. of Years' Records.	Mar., 1926.	Mar., 1925.
North Coast.	In.		In.	In.
Atherton	8·96	24	5·62	15·30
Cairns	18·09	43	6·81	28·07
Cardwell	16·27	53	7·62	23·92
Cooktown	15·33	49	4·85	28·08
Herberton	8·24	38	4·59	8·97
Ingham	15·74	33	8·77	24·13
Innisfail	26·16	44	17·42	43·04
Mossman	17·24	17	8·71	37·47
Townsville	7·72	54	1·78	7·36
Central Coast.				
Ayr	6·95	38	1·60	5·01
Bowen	5·78	54	2·84	5·11
Charters Towers ..	3·75	43	0·36	2·63
Mackay	12·13	54	6·98	14·87
Proserpine	11·66	22	9·96	19·62
St. Lawrence ...	5·89	54	2·26	2·23
South Coast.				
Biggenden	4·06	26	1·98	2·52
Bundaberg	5·38	42	2·83	5·79
Brisbane	5·75	75	1·93	9·26
Childers	4·87	30	1·74	3·73
Crohamhurst ...	11·67	30	4·87	18·44
Esk	4·85	38	2·56	7·49
Gayndah	3·23	54	1·43	1·57
Gympie	6·17	55	3·45	11·39
Caboolture	7·62	38	2·95	13·19
Kilkivan	3·98	46	1·03	3·03
Maryborough ...	6·23	53	3·41	6·90

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Mar.	No. of Years' Records.	Mar., 1926.	Mar., 1925.
South Coast—continued:	In.		In.	In.
Nambour	9·21	29	3·94	18·04
Nanango	3·36	43	1·54	2·97
Rockhampton ...	4·87	38	1·58	2·00
Woodford	7·99	38	2·12	14·67
Darling Downs.				
Dalby	2·71	55	3·44	2·89
Emu Vale	2·55	29	0·35	1·77
Jimbour	2·61	37	0·94	1·93
Miles	2·71	40	1·37	2·27
Stanthorpe ...	2·74	52	0·47	2·42
Toowoomba ...	3·87	53	0·79	4·66
Warwick	2·64	60	0·70	0·75
Maranoa.				
Roma	2·80	51	0·99	1·23
State Farms, &c.				
Bungeworgorai ...	1·77	11	1·38	1·35
Gatton College ...	3·34	26	2·33	3·15
Gindie	2·70	26	0·46	0·38
Hermitage ...	2·39	19	0·46	1·09
Kairi	8·28	10	7·70	12·93
Sugar Experiment Station, Mackay	10·95	28	9·36	14·68
Warren	2·69	11	2·03	1·96

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for March this year, and for the same period of 1925, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Meteorologist.

BREEDS OF PIGS—THE BERKSHIRE.

E. J. SHELTON, H.D.A., Instructor in Pig Raising.

Of the several breeds of pigs suited to the climatic conditions and to the environment of Queensland, none appear to be so popular or so widely distributed as the Old English Berkshire, also commonly known as the Berkshire, or more recently still as the Improved Berkshire. The type was named after the country in which it was originally developed and bred, and is considered to be the oldest of the improved breeds of pigs.

Historical records away back in the days of 1820 indicate that one. Lord Barrington, did much to improve this breed, which was at that time of a very much heavier and coarser type than is common nowadays. They were of a vari-coloured type—some were white, some quite black, whilst some were black and white with a large patch of white on the shoulder; some were rough-coated, others fine; and they were not noted for any special characteristics.

Herbert Humphrey was a very successful breeder of the type in 1862, the year when the breed was first given a special class at agricultural shows, and he was the chief mover in establishing the British Berkshire Society. For over twenty years he compiled the Herd Book and edited its proceedings. Since then breed societies, like the show yard, have exercised a stronger influence on type and quality than any other institution.

Berkshires are undoubtedly the most popular and the most suitable of the dual-purpose types. They were among the first to be improved and, seeing that they are suited not only to the cooler weather conditions prevailing in England, Europe, and America, but to the warmer climates of Africa, the Islands, and Australia, they rapidly become acclimatised and may be adapted to almost any conditions.

The breed possesses a ready aptitude to fatten, either as porkers or baconers, and can be killed to advantage from 4½ to 6 or 7 months old, the 6-months-old pigs being the most profitable. It costs more to feed them after they scale 130 lb. dressed, and the bacon-curers class them in a lower grade if too coarse or too heavy.

The Quality of Berkshire Pork and Bacon.

The average quality of Berkshire pork and bacon is such that it can be graded as extra prime. The fat and lean meat are fairly intermixed and of excellent quality. The pigs dress out well in proportion to their live weight. The large and lengthy framed Berkshire with a medium to short head and a fine coat of hair is much sought after. These are noted for early maturity, quick growth, and for prolificacy—three very desirable characteristics in any breed of pig.

The report of the British Berkshire Society states that the chief characteristics of the breed are their hardiness, active disposition, general conformation, and their evenly developed carcass, whilst as a breed they are unsurpassed as grazers and foragers. As a result of their strong digestive and assimilative powers their increase in weight is large in proportion to the amount of food consumed.

Their Early History.

It is recognised, of course, that Chinese, Neapolitan, and perhaps also Siamese pigs were used for mating with the Old English wild pig to form the foundation of the new type, and doubtless the prepotency of the Old Chinese type (which was white) has been handed down through the ages of improvement. The older types of Berkshire, as illustrated in a very old oil painting in possession of the Agricultural Department of the University of Edinburgh, shows the breed as of a chestnut colour with dark patches through the hair. Russet-coloured spots were common, and these still appear in Berkshires that show a tendency to degenerate. The colour comes out very strongly in second and third crosses of these types. In America they have a Red Berkshire, a type evidently evolved from this Old English russet-coloured strain with possibly additional Tamworth crosses.

The journal called "The Complete Grazier," in an issue of 1845, describes the breed after it had been materially improved from the standard of the earlier days, as in colour reddish-brown, with brown or black spots, sides very broad, legs flat, ears large and pendulous over eyes, body thick, close, and well made.

The Modern or Improved Type of Berkshire.

There can be no denying the fact that the Berkshire has undergone more changes in type under the influence of the showyard in recent years than any other breed of pig which has been recognised in prize schedules for an equal length of time. There

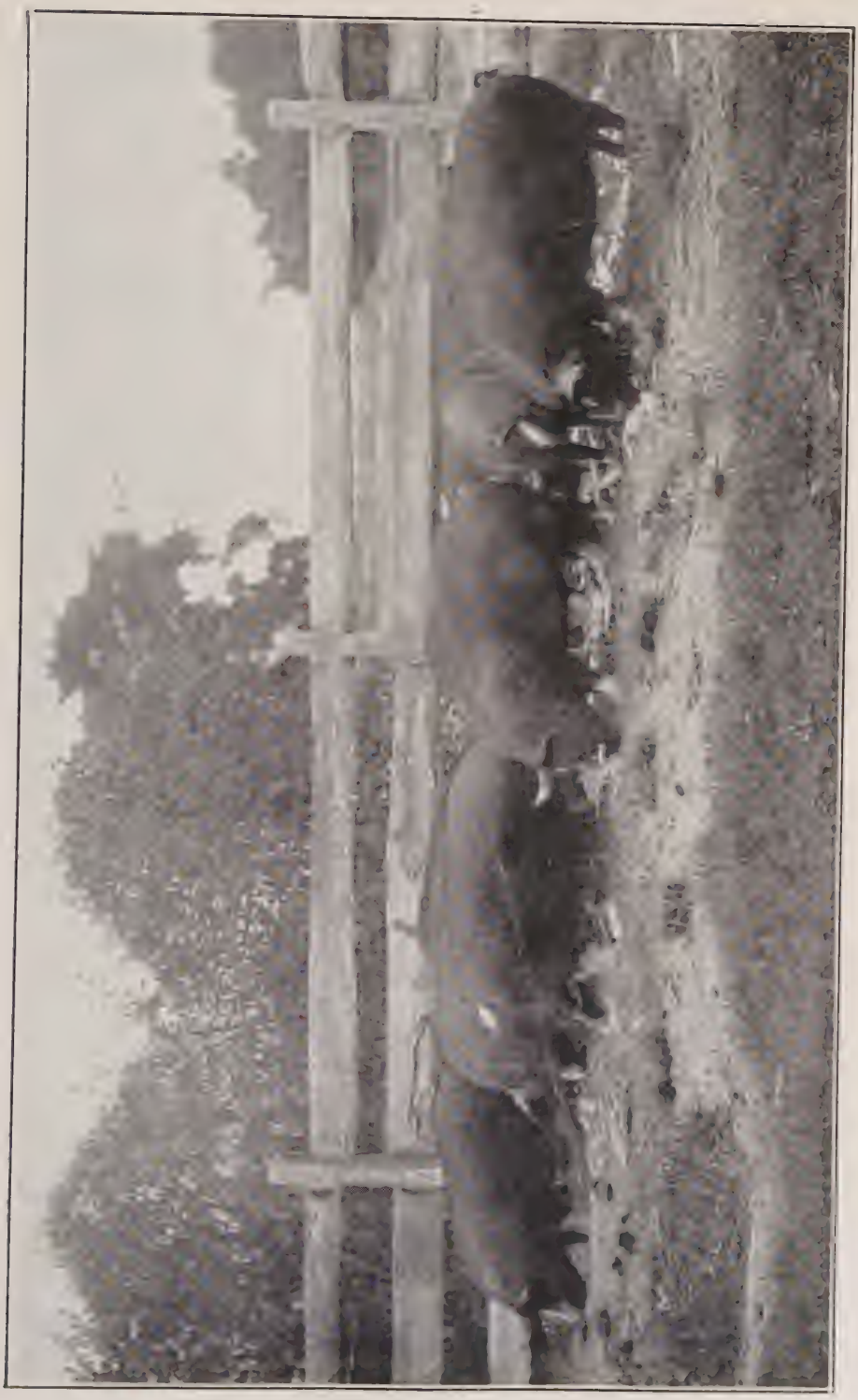


PLATE 129 (Fig. 1).—A GROUP OF SELECTED BERKSHIRE BROOD SOWS.
Sows of this description always realise good prices in normal seasons, and are sought after by

never was a time when quality and type were more keenly sought after and obtained by the breeder than now. There is no call nowadays for the long-nosed, rough-coated type of years ago.

Prominent amongst the characteristics for which the Berkshire is noted are:—

(1) Great muscular power and vitality, which renders them less liable to disease than any other breed. The boars are prepotent to a degree; the sows are fairly prolific.

(2) Activity, combined with strong digestive and assimilative powers; hence Berkshires return a maximum of flesh and fat for the food they consume. They are good "doers."

(3) The sows are careful nurses and good sucklers, and all are excellent grazers. They possess good limbs, and good-quality, fine, flat bone.

(4) The young pigs are strong, smart, and active at birth, consequently are less liable to mishap.

(5) They can be fattened for market at any time, whilst they can be fed to any reasonable weight desired.

(6) The flesh provides a high-quality pork and bacon much sought after, both by pork-buyers and bacon-curers.

(7) The Berkshire boar possesses remarkable powers in transmitting the valuable qualities of the breed to his progeny when used as a cross. This power is called "prepotency." No breed has been used more extensively for cross-breeding purposes or has been found so useful for refining the progeny of coarser types.

(8) Berkshires possess unsurpassed uniformity in colour markings and quality. They reproduce themselves faithfully. Their reasonable size, quick growth, and easy fattening powers, with uniformity and hardiness, make them a favourite with breeders of pigs generally.

The Modern Type.

The modern—or, as it is frequently erroneously styled, the "improved" Berkshire—is medium in size, trim, and free from roughness. They are well modelled and possess the very necessary length and depth of body and hams. The face is short and dished, the ears fine and erect and slightly pointed; the hair thick and fine, according to type, without "swirls" or "roses" (both faults in the showyard). To the pig fancier the modern Berkshire has a captivating and symmetrical outline.

When slaughtered, Berkshire flesh has a fine texture with the proper proportion of fat and lean. The meat is sweet and of good flavour. This is the result of quick growth and early maturity.

Both boars and sows have an excellent disposition; they are quiet, docile, and contented, and it is uncommon to find a bad-tempered fence-breaker amongst them.

The breed is fairly prolific under local conditions, and this characteristic can be distinctly improved by careful selection and breeding. In-and-in breeding, breeding too closely, and neglect soon tell their tale in reduced and irregular breeding powers. This also lowers the standard of quality and causes the animals to be classed as "slow growers."

Both the fine- and the thick-haired types do well here. The former or a medium type is the more popular. We see very little of the thick-haired types nowadays, for they are not as attractive nor as symmetrical as the medium-coated "improved" Berkshire.

The Breed Societies.

Following on after the formation of the British Berkshire Society in 1845, the American Berkshire Association was organised in 1875 and the National Berkshire Record in 1893. It was during the year 1900 that the Berkshire and Yorkshire Society of Australasia was organised, and this society grew to such dimensions that in later years it became necessary to reorganise the parent body. This has now been completed, the new organisation being styled "The Australian Stud Pig Breeders' Society," with headquarters in Melbourne and with branches in the various States. The Queensland branch secretary is Mr. R. G. Watson, of Inns of Court, Adelaide street, Brisbane, from whom can be obtained a beautifully illustrated brochure entitled "Better Pigs on Every Farm," in which the organisation and development of the society is also referred to.

These societies have done much for the Berkshire and for the other breeds registered in their herdbooks, and it has been the means of organising the distribution of the various breeds to the four corners of the Commonwealth. To-day in Australia

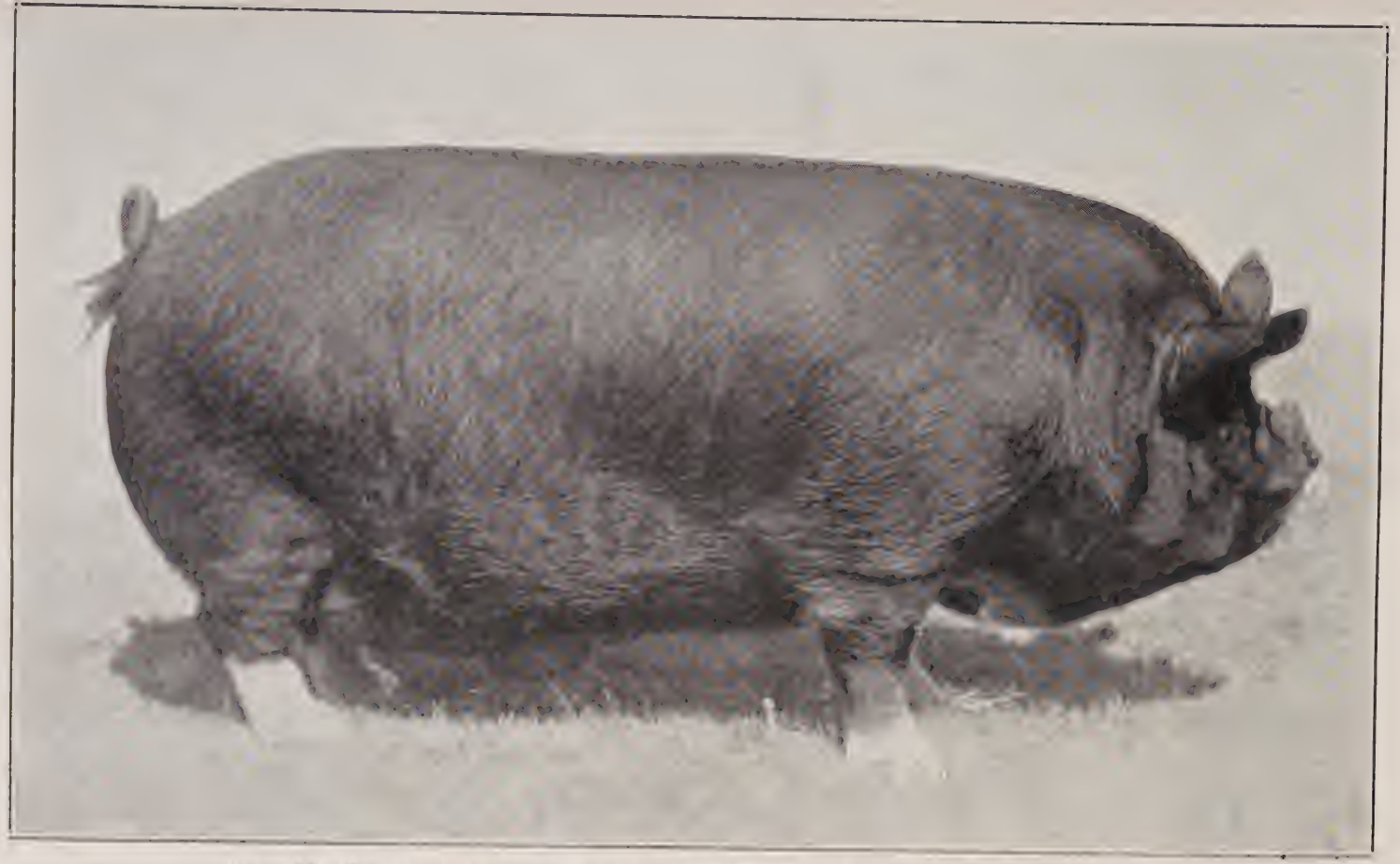


PLATE 13b (Fig. 2).—A CHAMPION PRIZE-WINNING BERKSHIRE BOAR—"GOONELLA COLONEL."
Note his depth and compactness together with evenness and neat attractive appearance.

Berkshires stand at the head of the list as being most readily adapted to any climate, soil, or condition; they will reproduce with equal facility and quality both for pork and bacon.

The Berkshire as a Breeder.

The Berkshire sow makes an excellent, contented mother—sturdy, vigorous, and thrifty, cleanly in habit (if given a chance to be so), fairly prolific, averaging from 8 to 10 pigs reared per litter. The suckers when born are lively, sturdy, keen, and develop rapidly.

Sows should not be retained as breeders when over seven or eight years of age, as they lose their teeth and often become very clumsy and poor sucklers. They can, of course, be fattened and marketed as back-fatters if food is reasonably cheap and plentiful.

If the stock are too finely bred, however, they deteriorate and produce puny litters. The breed exercises a powerful influence in the production of good-typed pigs in country districts. Cross-breeding can thus, by the maintenance of pure, strong, prepotent types, be made of considerable local value.

Berkshire Boars.

Some very high prices have been secured for Berkshire boars abroad. We have record of a genuine Canadian sale of the Berkshire boar "Premier Longfellow," who was champion at St. Louis State Fair in 1916, and at the sales realised £400. The record price in England is £500, whilst Berkshire sows have also topped the sales on many occasions. Stud pigs have never realised these prices in Australasia, but from 50 to 75 guineas each has been paid on several occasions in New South Wales and Victoria for selected animals.

A few years ago it was considered that the Berkshire was much superior to any other breed in prolificacy, but many breeders, taking advantage of the opportunities at auction sales of stud pigs and in show rings, have followed a system of excessively fattening their animals. This has in some instances resulted in a loss of refinement and quality in the young stock, and a still more serious defect in the loss of hereditary prepotency.

It has been truly said that the "pig is what the breeder and feeder make it."

The showyard winner of to-day is, unfortunately, often a short, chubby, unprofitable animal with an unnatural obesity, thick heavy forequarters, and poor breeding powers.

BERKSHIRE PIGS—THEIR SUPERIOR QUALITIES.

The British Berkshire Society, in whose herd books British Berkshire breeders have for many years past registered their stud animals, has recently been engaged in a progressive movement aiming at popularising this famous old breed amongst the men engaged in pig raising the world over. Some of the special characteristics which they bring under the notice of breeders are as follows, and Berkshire breeders in Queensland would do well to note these several points and use them in advertising their stock:—

BERKSHIRES

"Make more meat from meal than any other breed."

"They are hardy, docile, and exceptionally good mothers."

"They cross well with the best breeds, and improve the quality of the coarser ones."

"They thrive in climates as widely divergent as those of India and Canada."

"They obtain a premium from the leading bacon curers."

"They have won the Championship and Reserve Championship over all breeds in all carcase classes at Smithfield Show since their inauguration in 1904."

"They have won the Championships for the Best Pair of Pigs nineteen times (no other breed has won this more than three times)."

"They have won the Championship for the Best Single Pig nineteen times (no other breed has won this more than five times) at the thirty-seven Smithfield Shows since 1883."

"They have won the Whitley Challenge Cup for the Best Bacon Breed at the London Dairy Show. This record is unrivalled in the history of British live stock."

"The reason is: They yield more weight for age and a higher proportion of lean to fat, for a given weight, than any other breed."

PLATE 131 (Fig. 3).—A VICTORIAN-BRED BERKSHIRE SOW, "TOPSY OF YARRA" 3702.
Her progeny have been consistent prize-winners. She also won many prizes at Victorian and New South Wales Shows. She represents the best we have in this breed.

BERKSHIRES FOR PORK AND BACON.

In an interesting and informative pamphlet entitled "Berkshires for Pork and Bacon," issued under the auspices of the British Berkshire Society, the following records of the Berkshire breed appear. We make these excerpts for the benefit of breeders generally:—

1. The Record of the Berkshire Breed.

After being cultivated with increasing carefulness by individual breeders for more than one hundred years, Berkshires were the earliest registered of any breed of pigs in England, and they have been consistently developed with strict reference to commercial requirements ever since. To this is due the wonderful record of the Berkshire breed—a record unrivalled in the history of British live stock.

2. The Performance of the Berkshire Breed at the Smithfield Show (Carcase Classes).

Smithfield is the leading Fat Stock Show of the world, and the two judges in the carcase classes who are appointed from among expert butchers and curers—one from London and the other from the provinces—are changed every year. A third expert butcher or curer judges the Carcase Championship.

Since the Championship was inaugurated in 1904 up to 1923, both the Championship and Reserve Championship over all breeds have been won every year with only one exception by purebred Berkshires.

The following table shows the numbers of first prizes won by purebred Berkshires and their crosses and by other breeds and crosses since the inauguration of the carcase classes:—

Class.	Berkshires.	Berkshire Crosses.	Total Berkshires and B. Crosses.	Other Breeds and Crosses.
1 pig not over 100 lb. live weight ..	15	1	16	3
1 pig not over 6 months above 100 lb. not over 200 lb. live weight ..	18	1	19	nil
1 pig not over 9 months above 200 lb. not over 300 lb. live weight ..	14	2	16	3
1 pig over 160 lb. not over 240 lb. live weight, best for bacon, since 1910	10	1	11	1

3. The Percentage of Live Weight to Dead Weight of the Berkshire Breed.

The following table, compiled at Cambridge University for the "Journal of Agricultural Science," giving the comparative percentage of meat for pigs of different ages exhibited and slaughtered at Smithfield, shows the marked superiority of Berkshires over other breeds for both pork and bacon:—

	3 months.	5 months.	7 months.
Berkshires	77.0	78.7	81.1
Middle Whites ..	73.0	76.8	82.4
Large Whites ..	73.0	76.9	80.9
Large Blacks ..	72.9	73.9	79.7

It is to its superior fleshing capacity, combined with a higher proportion of lean to fat at the early age requisite for tender meat, that the pre-eminence of the Berkshire breed in the carcase classes is due, not only at Smithfield, but wherever they are shown in competition with other breeds.

4. The Performance of the Berkshire Breed at the Smithfield Show (Live Classes).

At Smithfield there are also classes for live pigs of every recognised breed, a challenge cup being awarded for the best single pig and a supreme champion prize for the best pen of two pigs.

The challenge cup for the best single pig of all breeds from 1888 to 1923 (thirty-three shows) has been awarded to—

Berkshires	19 times
Berkshire crosses	1 time
All other breeds and crosses	13 times

The championship for the best pen of two pigs of all breeds from 1883 to 1923 (thirty-eight shows) has been awarded to—

Berkshires	19 times
Berkshire crosses	7 times
Total	26
All other breeds and crosses, total	12 times

PLATE 132 (Fig. 4).—BERKSHIRE BOAR "WILCANNIA SPECIAL" (3709).

Property of Mrs. E. M. Lunnie, a noted Victorian breeder. This boar has a wonderful prize record, and his progeny have a record of which any stud breeder might well be proud. His markings are characteristic of the breed, while he is of excellent type and conformation.

5. The Performance of the Berkshire Breed at the London Dairy Show.

The "Whitley" Cup has been awarded annually since 1921 for the best bacon breed. The entries, which are made only by breed societies, consist of six pigs of any pure breed, dressed and cured, and are judged on advertised points.

The British Berkshire Society won in 1923 with a total of 85 points out of a possible 100.

Winners in 1924, the British Berkshire Society, with a maximum total of 100 points. Reserve, Wessex Saddleback Pig Society, 92 per cent.

Subjoined is the actual score:—

Correct proportion of cuts or joints including thickness of streaky.	Suitability of side, quality of meat, bone, &c.	Fat on back, lean meat, proportion fat and lean.	Firmness of Fat.	Firmness of Rind.	Deduction for seedy-cut.
Possible points .. 30	20	30	15	5	15
Berkshires actual .. 30	20	30	15	5	nil
Reserve No. awarded 28	18	28	14	4	nil

DETAILS OF CARCASES.

Age.	Live weight. lb.	Dead weight. lb.	Bacon weight. lb.	Loss from live to dead weight. per cent.	Loss from live to bacon weight. per cent.
Berkshires, 6 months 21 days ..	1,154	914	707	20.7	38.7
Reserve No., 6 months 18 days	1,258	993	519	21.0	40.3

No other breed in this class showed a loss from live to dead weight less than 20.7 per cent., or a loss from live to bacon weight less than 40.3 per cent.

The C. and T. Harris (Calne) Challenge Cup awarded to the exhibitor of the four best sides of Wiltshire bacon in the three pedigree or first-cross bacon carcase classes (first awarded in 1924). Winner, the British Berkshire Society, with purebred Berkshires.

(Extract from "The British Berkshire Annual," 1925, p. 29.)

6. The Berkshire Pig Abroad.

In the Argentine, Australia, and New Zealand—countries in which the commercial aspects of live stock breeding are alone of importance and where the most up-to-date methods are exclusively employed—Berkshires constitute two-thirds of the purebred pig population, which is a striking tribute to the suitability of the breed for all climates and conditions.

This fact assumes particular significance in the case of Australia and New Zealand, where bacon production is a large and growing industry.

In South Africa and Canada they are second in order of popularity, and they thrive in increasing numbers in Japan, India, the Malay States, and Central Europe.

In the United States of America, Berkshires have long had their own breed society. At the International Live Stock Show at Chicago, held annually, Berkshires have sired thirty champions, and have won first prize in one or more classes nineteen out of twenty-one years—a record unequalled by any other breed.

Since the war the demand for Berkshires for export to all parts of the world has steadily increased.

7. The Superiority of the Berkshire Cross for Bacon.

All independent experimental research for ascertaining the best cross for bacon shows that one or other parent—and preferably the dam—should always be a Berkshire.

For Wiltshire bacon, which commands the highest price in the world, the Western Curers' Association, in their leaflet, "Pigs for Bacon," say, "To produce at the greatest profit the best pigs for prime quality lean bacon, the farmer is recommended to breed his pigs from large white boars and pure Berkshire sows."

The experiments of the Canadian Government at Scott, Saskatchewan, which have been conducted under the supervision of a committee of curers, have reached the same conclusion, viz., that the large white boar on the Berkshire sow is a better cross for bacon than any other breed or cross.

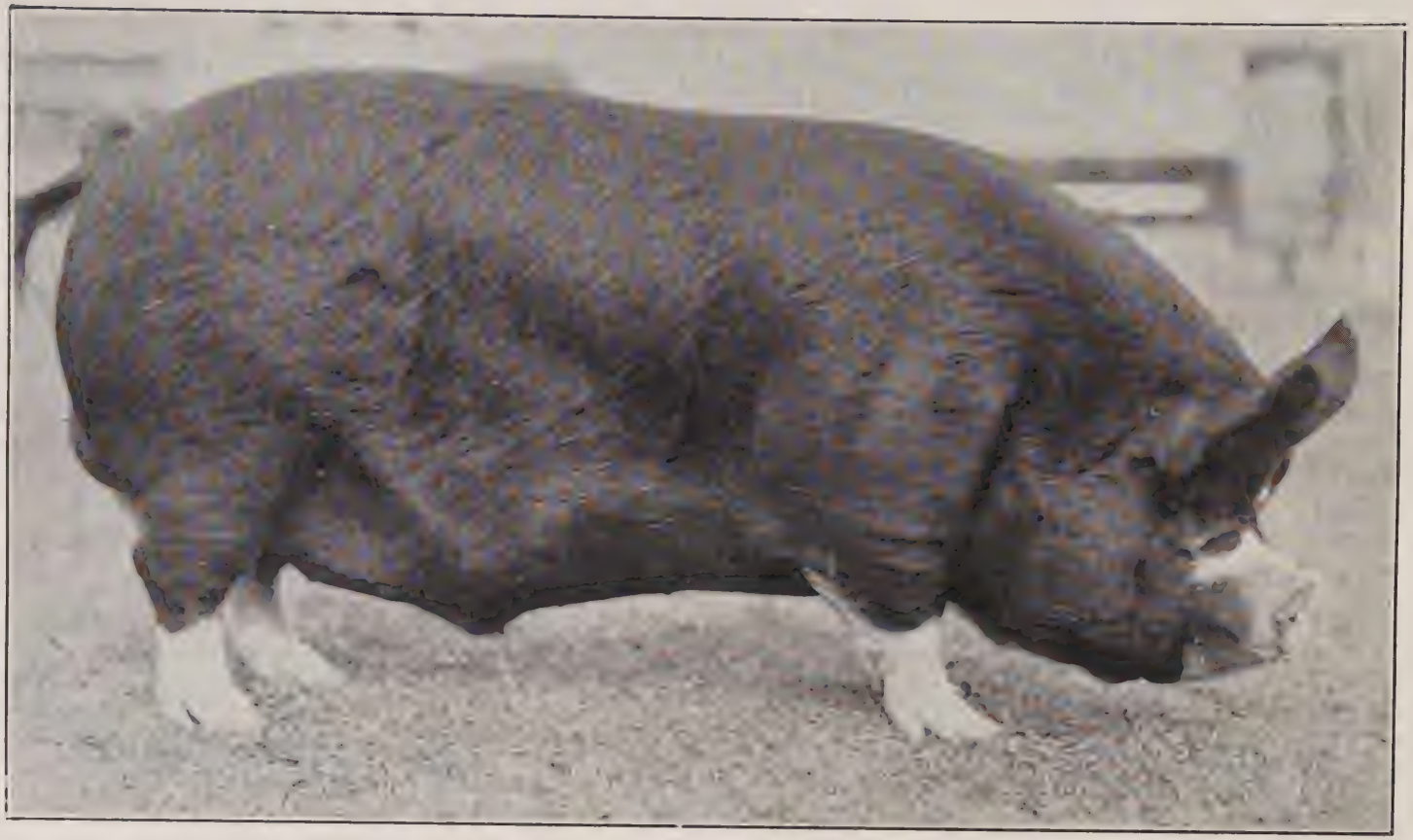


PLATE 133 (Fig. 5).—BERKSHIRE BOAR, "MURRAY GLEN STAR" 4969.

This Boar, the property of Queensland Agricultural High School and College, won championships both at Brisbane and Sydney Shows. He comes from a long line of prize-winning Berkshires. His sire, "Murray Glen Longfellow" 3681, sired many champions. Murray Glen Star's progeny have been in great request by Queensland breeders.

The Conformation of the Berkshire—"Standard of Excellence."

How closely the type to which the Berkshire has been bred corresponds with the requirements of the bacon curer may be seen by setting out in parallel columns the standard of excellence of the British Berkshire Society and the specification of the curers at a recent conference at the Ministry of Agriculture called for the purpose of ascertaining their requirements—

The Curer's Specification.	*The Berkshire Standard of Excellence.*
Back—Long and level, with ribs well sprung.	Long and level, with ribs well sprung.
Sides—Level and moderately deep.	Level and deep; free from wrinkles.
Hams—Broad, wide and deep to hock; tail set high.	Broad, wide and deep to hock; tail set high and fairly large.
Belly and Flank—Thick, with straight underline.	Thick, with straight underline.
Shoulders—Light, and on a line with forelegs below and with sides laterally free from wrinkles and coarseness.	Light and aligned with forelegs below and with sides laterally, well sloped backwards; free from wrinkles and coarseness.
Flank—Aligned with the sides.	Aligned with sides; should handle firm.
Head, Neck, and Jowl—Light.	Moderately short, face dished, snout broad, wide between the eyes and ears; ears fairly large, carried erect or slightly inclined forward and fringed with fine hair; jowl, light; neck, light and evenly set on shoulders.
Legs—Short, and set wide apart; the pig should stand well up on the tips of the toes.	Short, straight, and strong, set wide apart, and hoofs nearly erect.
Bone—Fine.	Fine.
Flesh—Firm, without excessive fat.	Firm, without excessive fat.
Skin—Free from coarseness and wrinkles.	Fine and free from wrinkles.
Hair—Fine.	Long, fine, and plentiful.

SOME INTERESTING LITTER RECORDS.

The statement that "Berkshires do not farrow enough pigs," a statement that has been often made in Queensland, in the other States, and abroad, has recently been challenged by the Berkshire breeders of America through their secretary, E. M. Christen, an authority on the breed, and an official who has done a great deal of research work over a long series of years.

When asked why this statement had been made, on the occasion of a chat to a prominent Berkshire breeder recently, the answer was short and not altogether satisfactory for, said the breeder referred to, "I don't know, but that is what people tell me." Now many pig breeders in the Northern State have said the same thing to the writer in the course of the past twelve months, and there seems to be a general impression that the Berkshire is not as prolific as it ought to be.

Observation had, however, taught Secretary Christen that these remarks were not true, because he had seen as many "producing" Berkshires as any other breed in the course of a five years' special study of this type. The ability of the Berkshire sow to produce a sufficient number of pigs was unquestioned in his mind. "Now," said he, "what was the evidence which could be presented to even a biased mind, which would convince him that average Berkshire sows not only farrow as many pigs as any other breed, but that they also rear as many?"

So attention has been turned to the statistics as contained in the first 1,400 litters recorded in volume 63 of the "American Berkshire Record." This survey brought the data strictly up to date, as the 1,400th litter was entered on 2nd July, 1924. This record of 1,400 litters does not include duplicates such as litter mates. The 1,400 litters showed a total of 12,309 pigs farrowed, or an average of 8.792 pigs to the litter. This is as good or better than the other breeds do, and considerably better than averages on farms where purebreds only are used.

Of the 12,309 pigs farrowed in these 1,400 litters, 9,803 of them were reared. This makes an average of 7.002 pigs reared per litter, which is well within the probabilities of a net return from the brood sow even now.

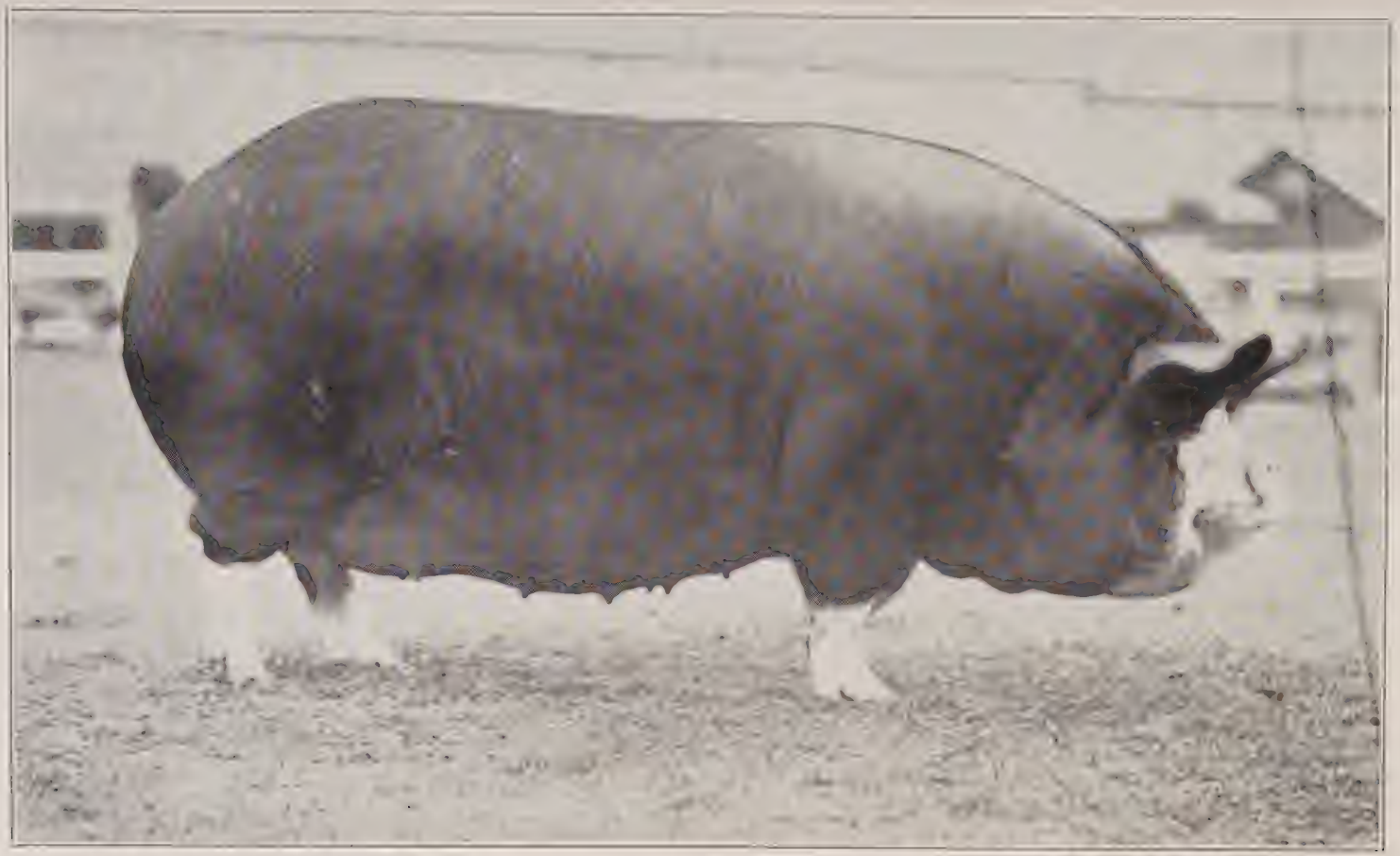


PLATE 134 (Fig. 6).—BERKSHIRE SOW "BRENTWOOD AMY" (5561).

Champion Berkshire Sow, Sydney Show, 1926. Property of O. A. Bidwill, a noted Victorian breeder. She also comes from a well known prize winning family. Her markings are not as true to Herd Book standards as is desirable, but she has good body development, a soft mellow skin and fine silky hair.

When one considers that these litters were farrowed and the records came from every State of the Union, from every age of sow, farrowed in every season of the year, and under every condition, we can accept them as authentic and without hesitation. One of the tasks of Berkshire breeders is to see that this information passes into the hands of men who do not know about the breed.

A Berkshire sow, or any sow to be profitable, must farrow a reasonable sized litter, and then rear them. It is true many pigs are lost before weaning time because of carelessness of the owner, improper management, or wrong feeding. The sow is nearly always charged with this loss, whether it is her fault or not, especially by the sceptic who does not know, nor desire to find, the truth. Breeders must present facts to counteract this.

At the same time we must not bind ourselves to the fact that certain sows or certain families do not produce as large litters as others. When such an animal is found the sow should be sold for pork. It is reasonable to expect the pigs in a small litter to be plumper and more attractive looking than those in litters of seven, eight, or ten. They ought to be, but there is no reason why they should be retained on the farm. The breeder must ask himself, and answer the question—"If the sow or boar in the big litter had had the same chance, would she or he be as good as the pig before us from a small litter?"

This has not been done in the past, and our selection of breeders has been largely a selection without respect to breeding, ancestry, or the chance the pig has actually had. Many simply select the best looking pigs. This is shown by the fact that practically every pig in litters of three, four, or five were all reared and (in the case of the American Herd Book referred to) were all registered, while it was seldom that more than four pigs were ever registered from a large litter.

It was also noticed that the litters in some herds ran uniformly large in size, while in others they were uniformly small. This goes to show that selection or care, or both, affect the number of pigs farrowed and reared.

A summary of the 1,400 litters mentioned above shows—

9	Litters	of	3	pigs	each
19	,,	,,	4	,,	,,
46	,,	,,	5	,,	,,
99	,,	,,	6	,,	,,
177	,,	,,	7	,,	,,
282	,,	,,	8	,,	,,
294	,,	,,	9	,,	,,
215	,,	,,	10	,,	,,
130	,,	,,	11	,,	,,
61	,,	,,	12	,,	,,
42	,,	,,	13	,,	,,
12	,,	,,	14	,,	,,
11	,,	,,	15	,,	,,
2	,,	,,	16	,,	,,
1	,,	,,	17	,,	,,

Total 1,400 with a total of 12,309 pigs farrowed and an average of 8.792 pigs to the litter.

In conclusion, we can say, and should say, that Berkshires are prolific and use the above-quoted authentic figures to show it. Also, that these Berkshire sows are good mothers, as they reared over seven pigs to the litter, or, to be exact, 9,803 pigs in the 1,400 litters. These figures come without any omission, with no effort to find a favourable record, but as a clean, short presentation as to what an average Berkshire sow will do and can be expected to do.

It is unfortunate that up to the present our Australian Stud Pig Breeders' Society Herd Books have published no record of the litters produced by the sows whose breeding has been recorded in these stud records.

Now, however, that it has become necessary for breeders to notify the secretary of the society in the State in which they reside as to the farrowing records of the stud sows and to give exact records as to the sale, transfer, and death of any stud animal registered in the herd book, it will be possible for Australian breeders to emulate the example set by Secretary Christen, and investigate the position to ascertain whether our Berkshire and other breeding sows are as productive and as profitable as they ought to be.

The Council of the Australian Stud Pig Breeders' Society have adopted the following:—

"STANDARD OF EXCELLENCE" FOR BERKSHIRE PIGS.

Colour—Black, with white on face, feet, and tip of tail.
Skin—Fine, and free from wrinkles.
Hair—Long, fine, and plentiful.
Head—Moderately short, face dished, snout broad, and wide between the eyes and ears.
Ears—Fairly large, carried erect or slightly inclined forward, and fringed with fine hair.
Neck—Medium length, evenly set on shoulders; jowl full and not heavy.
Shoulders—Fine and sloping well backwards, free from coarseness.
Back—Long and straight, ribs well sprung, sides deep.
Hams—Wide, and deep to hocks.
Tail—Set high, and fairly large.
Flank—Deep and well let down, making straight underline.
Legs and Feet—Short, straight, and strong, set wide apart, and hoofs nearly erect.

Objections.

A perfectly black face, foot, or tail. A rose back. White or sandy spots, or white skin on the body. A white ear. A very coarse mane, and inbent knees.

WILT-RESISTANT TOMATOES.

Mr. N. A. R. Pollock, Northern Instructor in Agriculture, writes:—

The attached copy of a letter from Mr. J. T. Moore provides convincing testimony of the value of this Department's work in overcoming the "wilt" trouble in the Queensland tomato crops, through the introduction of resistant tomatoes. It is specially pleasing to note that the two varieties most successful and in greatest demand are "Bowen Buckeye" and "Denisonia," both of which are departmental productions.

Subjoined is the text of the letter to which Mr. Pollock refers:—

The following information with regard to the production and distribution of pure and reliable wilt-resistant tomato seeds may be of interest to you.

Acting on your suggestion made early in 1923, and in accordance with your advice and instruction, I have been growing for seed the six most profitable varieties of these wilt-resistant tomatoes. During the first season (1923-1924) I received 54 orders; for the 1924-1925 season, 300 orders; and from 21st November, 1925, to 1st March, 1926, 305 orders.

Each of the first two periods covers a term of twelve months. You will thus see what a wonderful increase in the demand has taken place as a result of the value of the seed becoming known. Orders have been received from every State in the Commonwealth except Tasmania, and including the Northern Territory. Orders have also been received from Ceylon, New York, and Papua. The latest order from foreign sources came from the Director of Agriculture, Sarawak, Island of Borneo. He informs me that he has been following your reports published in "Queensland Agricultural Journal" with great interest. Practically all the leading seed merchants in Australia have been in communication with me on the subject of this seed. Mostly they desire quotations as well as information. My correspondence shows that these seeds are giving great satisfaction wherever the right variety has been planted. The splendid germination is constantly being commented on. The heavy cropping, fine flavour, and carrying capacity of the tomatoes themselves are giving growers great cause for satisfaction. The number of repeat orders being received, and the orders which are coming to hand on the recommendation of other growers, are very pleasing features.

The varieties most favoured are "Bowen Buckeye" and "Denisonia." Quite a considerable quantity of seed has been purchased this season by Bowen growers, which probably is the best recommendation of its excellence that could be obtained.

In conclusion, I have to congratulate you on an achievement which will have most lasting and beneficial results, which has added to my own personal prosperity and conferred incalculable benefit not only on Bowen tomato growers but on growers of this commodity wherever it is grown.

MEASURES AGAINST HAIL.

From a report on Agricultural Meteorology (Int. Agr. Inst. 1924)—Annexe I.

Different measures of defence have been employed in France to protect crops against hail, but only the "Fusees paragreles" have remained in favour, and it is estimated that 30,000 of these are manufactured annually in French factories. Agriculturists who use these fuses say that apart from their efficacy they are easily managed and that no costly installation is necessary. They say that they have observed that, following the penetration and detonation of these fuses in the heavy clouds, the latter seem to break and disperse. The adversaries of this process, however, say that hail is a phenomenon which is so irregular in time and space and its fall is often so local that it is difficult to pronounce on the action of the rockets. They specify that a district which is often subject for a long period of years to hail may receive none during a new period of practically the same length. These artifices show that the question of their efficacy is not yet cleared up and cannot be until methodical experiments have been undertaken. There are at the present time, on the French market, numerous models of rockets for use against hail. Certain of these are manufactured with first-class materials, and others, on the contrary, are of inferior quality with an efficacy which can be considered as nil, and their use has led to their abandonment in certain districts. Numerous agricultural syndicates for defence against hail are convinced that with apparatus well thought out, both from the point of view of the height of detonation and force of explosion, that they would have an efficacious defence against hail, and have asked for studies to be carried out to place at their disposal apparatus at a reasonable price. On the demand of the Agricultural Research Institute, the Ministry of War is now actually carrying out studies at the Pyrotechnical School. One can hope that they will not merely result in a type of rocket for use against hail fulfilling all the desiderata of agriculturists, but will also furnish the latter with information enabling them to control the quality of such artifices which are sold by private firms. At the present time firms make several types which seem to function satisfactorily, but of which conditions as regards safety, strength, and keeping quality could be improved. As soon as the new artifices have been elaborated and a sufficient stock obtained, methodical experiments will be organised by the Agricultural Research Institute in a district peculiarly liable to hail.

The foregoing extract was obtained from the Ministry of Agriculture and Fisheries (United Kingdom) in response to a request from this Department for recent information regarding the Stiger Vortex gun system for hail prevention. The Imperial Department also advises that a publication of the International Agricultural Institute "L'assurance grele dans quelques pays, et ses problemes," issued in 1911, contains particulars of experiments with the Stiger system conducted in France, Spain, Italy, and other European countries; while the Bulletins for November, 1910, and July, 1912, of the Bureau of Agricultural Intelligence and of Plant Diseases of the same Institute, contain short articles in English entitled "Protection against hail" and "The discharge of rockets to keep off hail" respectively.

MARKETING TABLE POULTRY.

In the true sense of the word, table poultry is not produced to any extent in this State, nor does the demand warrant its production.

The basis of the poultry industry is egg production, for which breeds such as Leghorns, utility Orpingtons, &c., are bred, the former variety predominating. Under these conditions the class of bird which forms the bulk of poultry sold for table purposes are young cockerels of both light and heavy breeds and hens culled on account of their age, or for other reasons which have rendered them unprofitable as egg producers.

In marketing there are two distinct conditions to be considered, namely:—1. Conditions which are entirely in the hands of the individual producer; and 2, conditions under which the birds are sold. The latter conditions, by reason of the fact that they apply to all producers selling poultry and to the fact that they do not come under the immediate control of the individual producer, are possibly the most important and therefore can take precedence.

Present System of Sale.

Although large numbers of birds are sold privately, the greater portion reach the consumer per medium of the auction markets. A conservative estimate of the value of poultry sold daily in the metropolitan area would be in the vicinity of £250. This, to some, may appear rather a high estimate, but an inspection of the markets will convince the observant person that the estimate errs on the low side.

These birds are received by the selling agents from the rail, or direct from the producer, in crates of all types, shapes, and sizes. They are then dumped on the saleroom floor, no effort being made by either the producer or agent in the direction of classification, and sold to the highest bidder.

Undoubtedly at times, even under these conditions, the birds tendered for sale realise very remunerative prices, but again at other periods they are sold considerably under their value. The low values are, no doubt, influenced by the supply and demand, but at the same time, if the birds were classified, displayed to advantage, and put up for auction in numbers which would permit of the general householder bidding, values would be materially increased.

The conditions under which table poultry are sold undoubtedly leaves room for improvement, both from a humane and a commercial point of view. From the humane point of view the crates used for forwarding birds to market should have sufficient head room and floor space for the number and variety consigned. They should be well ventilated and provided with water receptacles, the latter being firmly attached to each corner of the crate. The crates for fowls and ducks should be at least 18 in. high, and that for turkeys and geese 30 in. This permits of the birds crated being able to stand erect without injury. The actual dimensions or area required for an individual bird naturally varies according to the numbers and variety to be marketed at one time. Crates 4 ft. long by 2 ft. 6 in. wide, with a partition in the middle, will comfortably hold sixteen to twenty birds, according to their size and to the prevailing climatic conditions. The object of the partition is to prevent crowding to one end and consequent losses in the event of the crate becoming tilted in transit. The application of a little thought on the part of the producer as to the birds' comfort in transit should prevent overcrowding of crates.

Now, if the crates are well constructed, they will last for some time, as well as insuring the comfort of the birds both in transit and while awaiting sale. Good crates are worth being returned from markets, which obviates the necessity of constantly making makeshift crates. There is a correct time for marketing stock, whether they are young or old. Every day they are kept on the farm after reaching the period is adding to the farm costs. If crates are not available at the time the birds are invariably retained, possibly a week or so longer. The crates can, with a little care, be so constructed as to permit of the birds being seen to advantage by the buyers. Under the present conditions of selling, it is a few minutes' work for the assistant to burst open a crate and pass a bird or two around for inspection. Doors placed on the top of the crate would facilitate the work, allowing buyers greater time for examination.

At present practically the only type of buyer operating at poultry sales are poulterers and buyers for hotels and restaurants. Small buyers—that is, the household consumers—are unable to buy, for the sufficient reason that the birds are sold per crate at so much per pair. This may be necessary for the purpose of expediting sales, but it undoubtedly restricts the consumption of poultry meat, and producers would find it to their advantage to market choice stock in small lots.

To what extent the trade of selling dressed poultry is carried on is hard to estimate. The price charged by the majority of poulterers appears excessive, and frequently one notices very inferior stock exposed in windows for sale. There should be plenty of scope for the sale of dressed poultry at reasonable prices, providing it was as easily available to the consumer as butchers' meat and as reliable as regards quality.

Just how a dressed poultry trade is to be worked to the best advantage is difficult of solution, but the first essential is a live organisation, with loyal supporters, with the assistance of cold storage for holding reserves, regular supplies would always be available which would permit of contracts being made with clubs, leading hotels, &c., as well as supplying regularly, per delivery service, to private homes. Failing a delivery system being put into operation for the latter purpose, the selling of dressed poultry could be made a feature in many butchers' shops, but before this can be done an organised effort would be essential.

The individual producer has to give consideration to such questions as the time of marketing, condition of stock, grading, and crating.

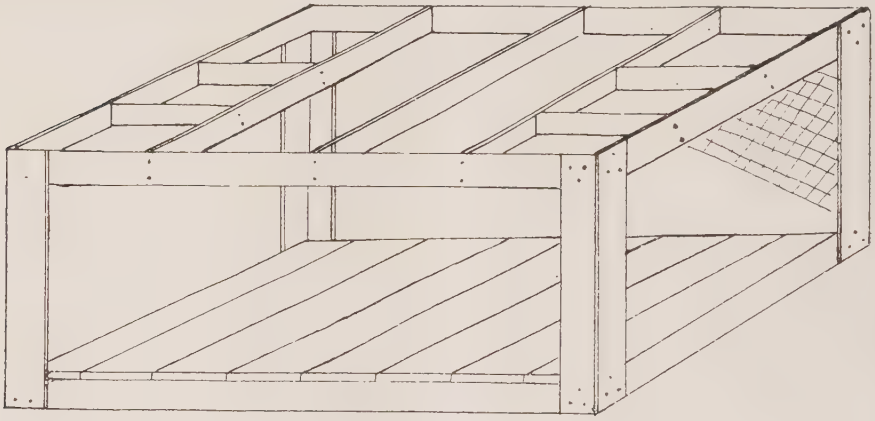
Cockerels constitute possibly the majority of the birds that a producer has yearly for sale, and present greater difficulties by reason of the fact that they have to be disposed of during a relatively short period. They may be sold at various ages, each age having its special advantage. Although the majority of the buyers prefer young stock for table purposes, they will not pay high prices for small half-grown birds when larger hens are available, which would proportionately be much cheaper. Having this in view, it is not a desirable practice for the producer to send half-grown cockerels to the market and expect to receive good prices for them during the period when the great majority of our old hens are being disposed of on account of age.

This period varies, but usually extends from some time in January until April. Young half-grown birds will find a ready sale from August until the Christmas season. After that period young stock should be well grown to command good prices, but not kept until they become staggy, which is indicated by spur growth.

It is necessary to give some attention to the general condition of the birds to be marketed. No good is done by sending on stock to saleroom low in condition, especially when it is considered that, in old hens particularly, there are only a few in such a state. It is not suggested that any attempt be made to fatten this class of bird, as they generally are constitutionally unfit, and the producer's ends would be better served if they were destroyed, as it may happen that these particular birds will be those examined by prospective buyers.

Cockerels, however, should receive some consideration and not treated, as they too frequently are, as an incumbrance and not worth feeding. If they are to be kept for any time at all they should be well treated and receive the same attention as the pullets; they have got to be grown, and the cheapest and quickest way of doing this is to feed them well. Rubbish in the way of food is no good. They require, for economical growth, the same ration as the pullets. Keep them free from intestinal worms and dispose of them as early as possible.

Crating should receive the attention previously suggested, and a good layer of straw or grass placed on the floor to ensure the stock being in a clean condition on reaching the market. The birds crated together should be alike as possible as regards age, size, and condition, and of the one variety.



Rough Sketch of Crate Suggested.

The sketch illustrates a crate of simple design, the measurements being 4 ft. long, 2 ft. 6 in. wide, and 18 in. high. It is made entirely of pine, the frame being 3 in. by $\frac{3}{4}$ in., and the bottom 6 in. by $\frac{5}{8}$ in. Doors are provided in the top, and the whole structure covered with 1$\frac{1}{2}$-in. mesh netting. If larger netting is used, it is desirable to place a piece of timber around the frame at least 2 in. higher than the floor to prevent the birds' legs protruding and becoming injured.

TWO INTERESTING PLANTS FROM NORTH QUEENSLAND.

In a recent paper read before the Royal Society of Queensland, Messrs. C. T. White and W. D. Francis described several new plants, among them the two trees here depicted. *Xanthostemon Youngii* was found at Temple Bay, Cape York Peninsula, by Mr. J. E. Young in July, 1923, when he accompanied Captain Wilkins in his visit to that territory. The species is peculiar among Australian species in its bright-red (not yellow or white) flowers, in which respect it approaches some species of the genus found in New Caledonia.

Cryptocarys corrugata was found on the Eungella Range by Mr. W. D. Francis, and was so named from the surface of the sapwood being longitudinally furrowed or corrugated. The genus is a large one widely distributed through the tropics and subtropics. The species attains a height of nearly 100 feet and stem diameter of 2 feet, and may later prove a useful timber.

Fig. 1.

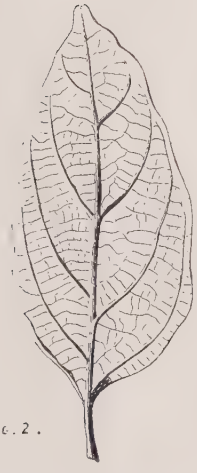


Fig. 2.

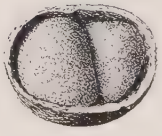


Fig. 3 × 1½

Fig. 4 × 1½.

PLATE 135.—CRYPTOCARYA CORRUGATA—A NEW TREE FROM THE EUNGELLA RANGES.

(1) A Fruiting Shoot about half natural size; (2) Underside of Leaf, natural size; (3) Traverse section of a Fruit; (4) A Cotyledon.

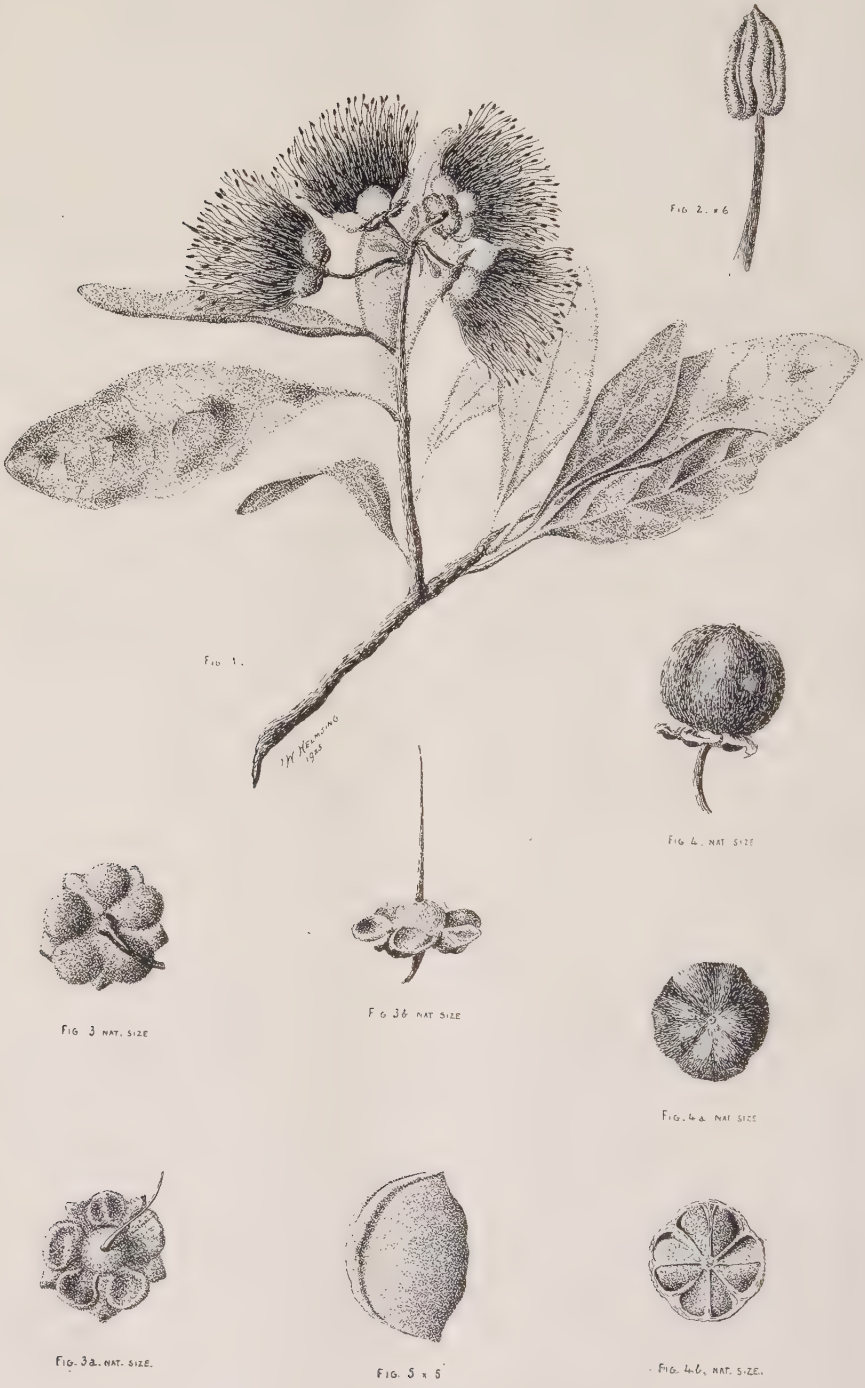


PLATE 136.—XANTHOSTEMON YOUNGII—AN INTERESTING TREE FROM THE CAPE YORK PENINSULA.

(1) A shoot about half natural size; (2) Anther; (3) Underside of calyx (3a) Calyx and ovary from above; (3b) Calyx and ovary from the side; (4) Fruit, side view; (4a) Fruit from above; (4b) Fruit in cross-section; (5) Seed.

INFECTIOUS CONJUNCTIVITIS (BLIGHT) IN CATTLE, SHEEP, GOATS, AND HORSES.

Cause.

This affection is by many held to be infectious, while others attribute it to irritant pollen or soil emanation.

Owing to the greater number of cases occurring during the summer months the pollen theory is supported, but it is also recognised that organised germs are preserved, multiplied, and diffused to a greater extent in the hot season, so that the origin of the disease from a purely microbian source is equally suspected. It is well known that in many outbreaks the affection spreads rapidly from animal to animal.

Symptoms.

Eyes become closed and swollen. Profuse secretion of tears, sometimes mixed with blood, changing in a few days to a thick purulent white or yellow secretion. In many cases the cornea becomes opaque, and in some instances erosions occur which cause perforations or loss of the eye.

Treatment.

Where practicable animals should be kept in cool, darkened stalls, although with large mobs of cattle or sheep this is impossible. The animals should be given an active purgative—Cattle, 1 lb. to 1½ lb. Epsom salts in three or four quarts of water; Sheep and goats, 4 oz. to 6 oz. Epsom salts in half a pint of water; horses, 4 to 5 drachms of Barbadoes aloes dissolved in one to one and a-half pints of water.

A few drops of the following solution should be applied to the affected eyes two or three times daily by means of a small glass syringe:—

Sulphate of zinc	10 grains.
Boracic acid	20 grains.
Water	8 ounces.

—Major A. H. Cory, M.R.C.V.S.

QUEENSLAND SHOW DATES, 1926.

The following is the official list of Queensland Show Dates for 1926, as issued by the Queensland Chamber of Agricultural Societies:—

Taroom: 3rd to 5th May.
Longreach: 5th and 6th May.
Oakey: 6th May.
Toogoolawah: 6th and 7th May.
Charleville: 5th and 6th May.
Wondai: 11th and 12th May.
Murgon: 13th and 14th May.
Blackall: 11th to 13th May.
Goombungee: 13th May.
Boonah: 12th and 13th May.
Roma: 18th and 19th May.
Kilkivan: 19th and 20th May.
Ipswich: 19th to 21st May.
Springsure: 19th and 20th May.
Wallumbilla: 25th and 26th May.
Esk: 26th and 27th May.
Maryborough: 25th to 27th May.
Childers: 29th to 31st May, and 1st June.
Marburg: 2nd and 3rd June.
Bundaberg: 3rd to 5th June.
Hughenden: 8th and 9th June.
Beaudesert: 8th and 9th June.
Gin Gin: 8th to 10th June.
Mundubbera: 9th and 10th June.
Woombye: 16th and 17th June.
Gayndah: 15th and 16th June.
Gladstone: 15th and 16th June.
Lowood: 18th and 19th June.
Mount Larcom: 18th and 19th June.
Rockhampton: 23rd to 26th June.
Gatton: 30th and 1st July.
Kilcoy: 1st and 2nd July.
Mackay: 1st to 3rd July.
Townsville: 6th to 8th July.
Laidley: 7th and 8th July.
Biggenden: 1st and 2nd July.
Woodford: 8th and 9th July.
Wellington Point: 10th July.
Charters Towers: 14th and 15th July.
Caboolture: 15th and 16th July.
Mount Gravatt: 17th July.
Maleny: 21st and 22nd July.
Rosewood: 23rd and 24th July.
Ayr: 23rd and 24th July.
Barcaldine: 27th and 28th July.
Nambour: 28th and 29th July.
Pine Rivers: 30th and 31st July.
Redcliffe: 4th and 5th August.
Sunnybank: 7th August.
Royal National: 9th to 14th August.
Crow's Nest: 25th and 26th August.
Coorparoo: 28th August.
Wynnum: 3rd and 4th September.
Enoggera: 9th September.
Zillmere: 11th September.
Gympie: 15th and 16th September.
Beenleigh: 16th and 17th September.
Pomona: 22nd and 23rd September.
Esk (Camp Drafting): 24th and 25th September.
Rocklea: 25th September.
Toombul: 1st and 2nd October.
Kenilworth: 7th October.

Answers to Correspondents.

Physical Defect in Boar.

H.B. (Milbong)—

Mr. Shelton, Instructor in Pig Raising, advises that, without inspection of the boar, it is not possible to express a definite opinion as to the effect on the animal or on his value for show purposes of the weakness noticeable in the front legs.

Unfortunately, many of our Berkshires, and some of other breeds also, show a tendency to weakness in the front legs. Some animals have had to be discarded altogether for this fault. There is always the possibility that the weakness may be hereditary, though perhaps to a large extent this could be overcome by mating the boar with sows strong in the legs. Mr. Shelton has often rejected weak-legged pigs when judging stock at shows, and, of course, when competition is keen these faults count for a great deal. It would pay to allow the boar the run of a good grassy paddock and to keep him off hard floors, for this sometimes exaggerate leg trouble. The feeding of lime water, sterilised bone meal, and charcoal is advised in order to strengthen the bony structure.

Meat Products for Pigs.

C.H. (Proston)—The Instructor in Pig Raising (Mr. Shelton) advises:—

Dried blood and blood meal are in reality the same product, the latter possibly carrying some bone content. The best product for feeding pigs is the meat meal, details of which are given in the pamphlets forwarded, for blood meal is an expensive line for general feeding purposes. Meat meal can be used to considerable advantage in combination with maize, pollard, &c., but where maize and pollard are being fed with milk and with green foods such as lucerne, rape, and barley, saccaline, &c., there should not be the same need for meat meal as in cases where both milk and green foods are in short supply. As a pig reaches maturity it requires less concentrated food, but in comparison more bulky food.

It is good to note that your experiments in pig-feeding have been so successful. The secret of success in feeding pigs lies largely in the judicious utilisation on the farm of food supplies produced thereon, and in feeding these to healthy, well-developed stock suited to the class of production required.

Thriftless Pigs.

P.C. (Mundubbera)—

You have got hold of what would, in the stockyard, be called a "crook" line of pigs, a line which has evidently been weaned very early, probably at five or six weeks old and before they had learned to feed from their own feeding trough. Pigs in such a condition fret considerably for their mother and what with this restlessness day and night, and a class of food probably in their case difficult of digestion, they get a very bad set back. They are thus susceptible to any disease which may happen along—such, for instance, as an epidemic of influenza—for there are epidemic diseases among stock just as there are outbreaks of disease among human beings.

The dry cough possibly also indicates irritation of the throat, perhaps through dusty yards or coarse fibrous feeding stuffs. Young pigs, such as those to which you refer, sometimes get into the habit at night time of all sleeping together packed up, as it were, in one corner of the sty. They will even crawl over one another in an endeavour to secure a better "possie." The result is that those for the time being underneath become overheated and sweated until finally they are forced to wriggle out. This upsets the others, perhaps a sort of fight results, and very often the overheated animals finish up on the outside of the pack altogether; then they will chill down very rapidly, and finish up with cold in the head, cough, &c.

Tuberculosis is all too common in many of our piggeries, particularly on dairy farms where the cows have not undergone the tuberculin test. Mr. Shelton advises getting rid of the bad doers.

Constipation, indigestion, and parasitic infestation are both indicated in the symptoms your describe. Why not ask the District Stock Inspector to call in and advise you?

Plant Identified—"Portuguese Elm."

W.P. (Imbil)—

The Government Botanist, Mr. C T. White, F.L.S., advises that the specimen No. 181A, forwarded with your letter of the 13th instant, is *Celtis sinensis*, a native of China. It is commonly called in Queensland "Portuguese Elm," a name more rightly belonging to another species, *Celtis australis*, a native of Southern Europe. *C. sinensis* has attracted some attention lately as a fodder.

Soudan Grass Seed not Favoured as Pig Food.

C.H. (Yangan)—

Re feeding Soudan grass seed to pigs, this seed being adulterated with castor-oil plant seed, and probably other seeds, the Instructor in Pig Raising (Mr. Shelton) cannot advise the use of this as pig food, for it is certainly quite possible to poison pigs by feeding castor-oil beans or other seed containing toxic properties, particularly where these seeds are ground up and the resultant meal used as a mash with pollard, &c. In fact, there are many other foods of a poisonous or at least an injurious nature, such for instance as musty or mouldy grain, decaying curd, and other milk products which have become decomposed. Then, of course, brine, the water in which salt meat has been cooked, hot cabbage water, and decomposing soup and meat products must not be given to pigs. It does not pay to give any food to pigs about which there is the slightest doubt, and it is certainly an erroneous idea to think that it is not possible to poison pigs.

The Care and Feeding of Pigs.

J.C. (Bemerside)—

Pigs must have a certain proportion of grain food and some mineral matters in addition to a liberal supply of green food and drinking water. Cassava, boiled, is not altogether a suitable food for pigs except as part of a well-balanced ration. It is very fibrous, and is liable to cause digestive disorders if fed too liberally, though we are well aware that it is spoken of very frequently as a very suitable pig food.

Mr. Shelton advises that experiments are planned to test cassava as a pig food in comparison with other crops and as part of a ration, and the result will be given due publicity. Molasses mixed in water is an unsuitable food, though molasses can be and is being used to advantage, but only when its use takes the form of a condiment (like sugar sprinkled over the morning plate of porridge) or when it is worked in a ration balanced up with protein foods, for molasses is a heat and energy producer and not a flesh former.

Re the use of green panicum grass cut fine with the chaff cutter—here again you are using a fibrous and apparently coarse feeding stuff, for it should not be necessary to chaff any green food for pigs; they much prefer succulent green stuff before it reaches the coarse fibrous seeding stage. Even sorghums, which should not be fed before they flower, are of greater food value in the succulent juicy stage. They are reduced in food value, though to an extent still useful, when the leaves turn yellow and the plant dries or is frosted off. The addition of pollard to a coarse fibrous ration is not advised; it would be preferable to mix the pollard with water, adding from one-half to, say, two pounds of molasses to the ordinary daily ration of the pigs, the larger quantity for full-grown animals. Some breeders add from one tablespoonful (about half fluid ounce) to half a pint (40 fluid ounces); this could be added to each gallon of milk where the latter is being fed, and the same quantities, or slightly more, could be used where water takes the place of milk, but it is preferable to feed a very small quantity at first, increasing the amount as the animals become accustomed to it. It must always be remembered that the laxative effect of molasses may lead to digestive disorders and cause severe scouring, particularly in very young pigs if given in excess, hence great care is necessary in the early stages of its use.

As to whether you could grow pigs profitably on a diet of cassava (boiled), molasses, and chaffed panicum, our advice is not to attempt it, for the diet is quite unsuitable, and the stock will not develop satisfactorily. You will need to read up this subject carefully; remember also that while cowpeas in the form of grain can be utilised as a satisfactory green food, the cowpea vine is also too fibrous, and few pigs will attempt to eat it if there is any other more succulent green stuff available. Pamphlets forwarded.

Tuberculosis in Pigs.

G.N. (Toogoolawah)—

The Instructor in Pig Raising (Mr. Shelton) advises that it is apparent that some of your pigs are suffering from tuberculosis. This disease invariably finds its way to the pig by milk from diseased cows or flesh of carcasses suffering from the disease. We recommend your having the District Stock Inspector inspect your cows with a view to advising you as to their health; he may even recommend the Tuberculin test, for this is recognised as the surest test for ascertaining whether animals are diseased or not. We note that you keep your pigs in a shed with a cement floor. The pigs would be far healthier if they were kept out in a good pig-run, where they would have the benefit not only of the sunshine, but of good succulent grass and green stuff. It is not absolutely essential that pigs should be shut up in small sties for fattening purposes; they mature to more advantage when given reasonable exercise and liberal supplies of green food with their grain and milk. See Pamphlet re Construction of Sties, &c.

"Wild Lucerne" (*Stylosanthes mucronata*).

L.H. (Brandon)—

The Government Botanist, Mr. C. T. White, F.L.S., advises:—

The plant forwarded for identification is *Stylosanthes mucronata*, commonly known in North Queensland as "Wild Lucerne." It is a native of the West Indies and tropical America, but has now a wide distribution over the tropics generally. It was first noticed about Townsville in 1913, and was then simply regarded as a pest on town lawns, but as soon as it spread it was recognised as a valuable fodder, both palatable and nutritious. An analysis made by the Agricultural Chemist (Mr. J. C. Brünnich, F.I.C.) showed it to compare favourably with lucerne in nutritive value. The only drawback to the plant is its annual character.

"Roley Poley"—Noxious Weeds.

J.G. (Bowenville)—

The Government Botanist, Mr. C. T. White, F.L.S., advises that the specimens of "Roley Poley" forwarded with your letter of the 7th instant are—

No. 1.—*Bassia Birchii* (see leaflet posted). This plant is also commonly known as Galvanised Burr. This species is spread throughout the whole of the Central West and South-West, Western Darling Downs, and similar country. It is, Mr. White thinks, most abundant in the Darling Downs, Maranoa, and Warrego districts.

No. 3.—*Bassia quinquecuspis.* This species has much the same distribution as *Bassia Birchii.* It is believed to be most abundant in the Central West (Mitchell district), where it is commonly known as "Bindii" or "Bindy-eye," a name now applied to a number of burr plants in Western Queensland.

Nos. 2 and 4.—Mr. White would refer both to *Bassia gracilicuspis.* Most botanists refer this to a variety of No. 3 under the name of *Bassia quinquecuspis* var. *villosa.* He prefers, however, to keep it as a species intermediate between the other two. It has much the same range as Nos. 1 and 2, but is most abundant in the Darling Downs and Maranoa districts.

With reference to your other query, the following appeared in the last annual report of the Prickly-pear Land Commission, pp. 48-49:—

"There are other serious noxious weeds in the State besides prickly-pear, but the all important difference is that the pear is an air plant while the others are not. If pear is cut down the plant still lives. The butt grows again while the fallen leaves strike fresh root. Owing to this quality the pest can never be said to have been destroyed until by the application of poison of fire it has become lifeless to the extremities of the roots. Although this characteristic is confined to the pear other noxious weeds are sufficiently serious to engage close attention.

"Some ten years ago 'galvanised burr' was not widely known. One can remember that in the St. George district, only seven years ago, its mention called forth the smiles of the unknowing. Now, unfortunately, it is known all too well. Originally confined to the stock routes, its spread during the last few years has been amazing. Whole paddocks have been ruined by it. What might have been eradicated for a few pounds ten years ago would now cost many thousands. Well might local authorities and others take heed of the teachings of the past. Other districts yet have time to protect themselves. There is still truth in the old adage, 'A stitch in time saves nine.'"

"Wild Cotton" or "Balloon Cotton."

F.R. (Tumoulin)—

The Government Botanist (Mr. C. T. White, F.L.S.) advises that the specimen sent is *Gomphocarpus physocarpus*, known in Queensland variously as "Wild Cotton" and "Balloon Cotton." It is a native of South Africa and along with a closely allied species (*G. fruticosus*) is a common weed on Queensland farms, often over-running them and proving a great pest, particularly on rich scrub country. It has been thought that the cotton contained in the pods and attached to the seeds might be of commercial value, but any value it possesses is only that of a kapok; it is of no use for spinning. The bark is fibrous and, no doubt, with a cheap system of collection and treatment would be of commercial value. The plant has been accused of poisoning stock, but nothing very definite is known under this head; it belongs, however, to a poisonous family, the Asclepiadeæ, and therefore the reports may have some foundation in fact. Fortunately it is very rarely troubled by stock. Though a weed the plant is often grown in gardens, on account of its rather quaint characters. I will be pleased to report on plants you send at any time and on which you require some information for your nature study work.

Impaction in Sheep.

V.E.W. (Surat)—Mr. W. G. Brown, Instructor in Sheep and Wool, advises:—

I note that your correspondent fears impaction through having only dry feed for his ewes. He is right. This can be avoided by the use of Epsom salts, especially as his sheep drink at troughs. This can be administered by keeping up a supply of Epsom salts to the water they drink. I must state that purgatives are generally dangerous to give to pregnant sheep, but it can be arranged that they do not get anything violent in that way. Sheep on dry feed and in warm or hot weather require about one gallon of water per day. If 5 per cent. of Epsom salts be added to the water in the troughs, it will help the sheep over the troubled time of lambing as far as impaction is concerned. The method I advocate is to place a cask, say of 30 gallons, on the end of the trough and nearly fill it with water, adding Epsom salts in the proportion of about one and one-half ounces of Epsom salts per gallon. This should be dribbled into the troughs through a small hole in the cask. If there is a big drain on the troughs through the hours when sheep drink, care should be taken that more salts be used. Epsom salts may be purchased in bulk from Messrs. Taylor and Elliott, manufacturing chemists, Brisbane, at about 3d. per lb. Epsom salts is much cheaper and more effective than molasses.

Suggestions for Show Schedule.

P.C. (Mundubbera)—The Instructor in Pig Raising (Mr. Shelton) suggests the following as a suitable show schedule:—

Berkshires.—Berkshire boar, 12 months old or over; Berkshire boar under 12 months; pen of three Berkshire boars or sows or mixed sexes under 4 months; ditto for sows, except pen of three. Ditto for Tamworths.

In Poland-Chinas provide classes for boar and sow any age, ditto for Middle Yorkshires, Duroc-Jerseys, and any other pure breed.

Champion Badge for best boar and sow of the Show and for best pen of three purebred pigs.

In baconers and porkers the following classes might be provided:—

Three Bacon Pigs, any breed or cross, 90 to 120 lb. estimated dressed weight: none but prime-quality baconers and porkers will be eligible to win in these classes.

Three Porker Pigs, any breed or cross, 60 to 80 lb. estimated dressed weight.

Champion pen of Bacon Pigs.

Re Sow and litter, this is not a very satisfactory class and had better be deleted unless you have had good entries in the past.

Re prize money. It is suggested that £2 2s. as first prizes, and £1 1s. as second, with prize card for third and other awards throughout this section, be offered, as it is useless providing the classes unless the prize money is sufficient to warrant the expense.

A special prize for the best pig shown by a boy or girl attending any of the State or Rural Schools is also suggested. In this case some declaration would be necessary in order to ensure genuine competition from junior farmers.

General Notes.

Dairy Produce Act.

An additional regulation has been made under the Dairy Produce Act, providing that all cheese shall be aerated by the manufacturer at the factory before being despatched to oversea and interstate markets.

The Imperial College of Tropical Agriculture.

We have received a copy of the prospectus of the Imperial College of Tropical Agriculture, England, for the year 1926-27, including the Principal's report for the year 1924-25 and register. Former students of the College are now holding important agricultural positions in Uganda, the Gold Coast, the Sudan, Southern Rhodesia, Nyasaland, Ceylon, Natal, British Guinea, and the West Indies. The governing body of the College is making an appeal for £45,000 for the provision of a hostel for the students, and an estate on which the business side of farming can be taught.

An East Brisbane Sanctuary.

The grounds of the Church of England Grammar School and Heath Park, East Brisbane, have been declared a sanctuary for animals and birds, and Mr. R. G. Lanskey, M.Sc., Rev. E. A. Hunt, and Aldermen A. Elliott and R. W. H. Long have been made officers under the Animals and Birds Acts, and will act as honorary rangers for the sanctuary in question.

Atherton Tableland Maize Board.

In connection with the Atherton Tableland Maize Board, provision has been made that the onus of proof that any maize sold or delivered to or bought or received from any person other than the Board is or was not maize declared by the Order in Council constituting the Board, and declaring maize to be a commodity under the Primary Products Pools Acts, shall be on the person who sold or delivered or bought or received such maize.

City Milk Supply.

The Minister for Agriculture (Hon. W. Forgan Smith) made reference recently to the matter of a city milk supply. The Minister stated that two deputations from the Greater Brisbane Council had waited upon him in connection with this matter, He said that he recognised that the matter of providing the citizens with a supply of pure milk raised under highly hygenic conditions and delivered to the consumers in a pure and wholesome condition was to be regarded as a function of the Council.

The members of the Council specifically desired that the supervision of the dairies within the Greater Brisbane area should be brought under their direct purview. Mr. Smith informed the deputation that he was prepared to accede to their request in this matter. Additionally, the Council submitted a scheme under which it was proposed to deal with the treatment and delivery of milk within the Council area.

The principal features of the scheme included the establishment of a depôt to which there would be attached an inspectional staff, who would examine and pass the milk conforming to the required standards, and, further, the Council would enforce the block system for milk delivery.

"Since the proposed scheme for the control of the milk supply has been in my possession," stated Mr. Smith, "I have had opportunity to peruse and consider same. It is obvious that the scheme in its existing form fails to meet the case. The provision that warm milk should pass through a single depôt would in practise mean that milk would be drawn over long distances to the depôt for treatment, and subsequently the milk would be carried over the same stages to the consumer.

"Say, for example, that it was decided to erect a depôt in the vicinity of the Roma Street Railway Station, it would then follow that the milk raised at Caboolture or Bowen Hills would be brought into the depôt through Eagle Junction, and after treatment it would be conveyed back to Eagle Junction for distribution amongst the consumers there.

"A provision is also made to impose a rental of £75 per week upon the depôt, and lease it to a company, which will be formed for the purpose of engaging in the milk trade, thereby practically ensuring a monopoly of the milk trade to whatever company may decide to lease the depôt from the Council. This I consider is wrong in principle, and I much doubt the authority of the Council to give a monopoly of the milk trade to any company."

"Bunchy Top" a Notifiable Disease.

All proclamations and regulations under the Diseases in Plants Acts have been revised, and a consolidation of same has now been made. Included in the proclamations is one making Bunchy Top a notifiable disease.

Sugar Assessments.

The Minister for Agriculture (Hon. W. Forgan Smith) announced recently that consideration had been given to the question of payment of assessments by millowners and owners of sugar works under "*The Regulation of Sugar Cane Prices Acts,* 1915 *to* 1922," *and* "*The Sugar Experiment Stations Acts,* 1900 *to* 1923," respectively.

It has been decided that the levy on every ton of sugar received at a mill during the season 1926-27 under the former Act shall be 1d., and under the latter Act ½d. This represents a reduction in each case to half the rate of assessment which was hitherto collected, and if applied to a crop of equal tonnage to that of last season would represent a saving to the sugar industry of approximately £19,800.

Predaceous Enemy of Banana Weevil Borer—Further Importations to Queensland.

The Chief Entomologist (Mr. Veitch) has received from Java a further colony of a predaceous beetle, the establishment of which may materially assist in the control of the banana weevil borer in Queensland. The colony just to hand has been liberated in the Yandina district by Mr. Froggatt, the Entomologist in charge of banana insect pest investigations. Another colony is expected in the immediate future, and arrangements will be made by the Department of Agriculture and Stock for its liberation on a suitable plantation. These importations are wholly experimental, and the efficiency of this predaceous beetle under Queensland conditions still remains to be demonstrated if and when it becomes permanently established in this State. The information available regarding its voracious feeding habits is, however, sufficiently impressive to warrant the importations now being made.

Staff Changes and Appointments.

The appointment of Mr. J. P. H. Clark as Inspector of Stock, Blackduck Creek, Helidon, has been confirmed.

Mr. L. L. Manchester, Part-time Veterinary Officer, Rockhampton, will be transferred to Atherton as from the 1st June, 1926.

Mr. C. A. Morrison will act as Chairman of the Proserpine Local Sugar Cane Prices Board during the absence on leave of Mr. G. A. Cameron.

The Hon. A. M. Campbell, I.S.O., of Caloundra, has tendered his resignation as Officer under the Animals and Birds Acts, and same has been accepted.

Mr. T. R. E. Mitchell, Manager of the State Nursery, Bribie Island, has been appointed Officer under the Animals and Birds Acts.

The term of office of the present Members of the Butter Board, viz., Messrs. J. L. Wilson, J. T. Mulcahy, J. Purcell, C. H. Jamieson, T. F. Plunkett, and L. R. Macgregor, has been extended from the 28th April, 1926, to the 31st July, 1926.

Mr. C. F. McGrath has been appointed Supervisor of Dairying, Department of Agriculture and Stock, as from the 1st April, 1926.

Mr. H. Barnes has been appointed Temporary Inspector under the Diseases in Plants Acts.

The resignation of Mr. H. Hallam, Inspector of Slaughterhouses and Inspector Live Stock and Meat Export, has been accepted as from the 26th March, 1926.

Mr. L. A. Mackenzie has been appointed Government Representative on the Leichhardt East Dingo Board, *vice* Mr. F. P. Green, resigned.

Mr. H. C. Pegler has been appointed Government Representative on the Adavale Dingo Board; and the Clerk of Petty Sessions, Blackall, has been appointed Government Representative on the Barcoo Dingo Board during the absence of the Police Magistrate, Blackall.

The resignation of Mr. T. Flood Plunkett as Government Representative on the East Moreton Dingo Board has been accepted.

The resignation of Mr. H. N. C. Cannon, of Woodbury, as Honorary Inspector, Diseases in Plants Acts, has been accepted.

Mr. S. F. Russ and Mr. F. G. Harris have been appointed millowners' representatives on the Cattle Creek Local Sugar Cane Prices Board, *vice* Messrs. P. H. McLean and D. D. Lehane.

Appreciation.

A Southern correspondent writes: "I am unable to remember having acknowledged receipt of the booklets requested in mine of the 20th February last, but as one of them proved of great service to me to-day, I take this opportunity of asking you to accept my thanks for same. They are a most useful budget of information, written in language that is comprehensible by the most illiterate, and frequent recourse to the information contained therein should make farming a much safer proposition."

Portland Cement—Australian Standard Specification.

The Australian Commonwealth Engineering Standards Association announces that the tentative Australian standard specification and tests for Portland cement, which was published in May, 1925, will be reviewed for issue as an Australian standard specification in May next. The policy of the association is to issue each of its specifications in tentative form for a period of twelve months, during which time constructive criticism is invited. All criticism submitted to the association is referred to the sectional committee concerned for consideration when the specification comes under review.

Manufacturers and users of cement and others interested in the specification in question are invited to submit suggestions for the revision of the tentative specification, to be forwarded to the headquarters of the association, Macleay House, 16 College street, Sydney, not later than Saturday, the 15th May, 1926.

Opossum Boards.

The Department of Agriculture and Stock has announced the following appointments of trappers' representatives on Opossum Boards. These appointments were necessary, as no nominations were received for the position on the boards indicated:—

Moreton Opossum Board, G. W. Martens.
South-Western Opossum Board, W. J. Shanahan.
Northern Coast Opossum Board, C. G. Fallon.

The personnel of the eight Opossum Boards is as follows:—

Moreton Opossum Board (headquarters Brisbane)—
R. P. M. Short (chairman and Government representative).
C. S. Delpratt (owners' representative).
G. W. Martens (trappers' representative).

Darling Downs (headquarters Toowoomba)—
R. J. F. O'Bryen (chairman and Government representative).
Donald Gunn (owners' representative)
H. Slack (trappers' representative).

South-Western (headquarters Roma)—
J. L. Bowman (chairman and Government representative).
S. R. C. Harding (owners' representative).
W. J. Shanahon (trappers' representative).

Wide Bay and Burnett (headquarters Maryborough)—
J. Taylor (chairman and Government representative).
F. R. Briggs (owners' representative).
R. W. Macey (trappers' representative).

Central Coast (headquarters Rockhampton)—
W. H. Crank (chairman and Government representative).
T. Smith (owners' representative).
J. F. Lindley (trappers' representative).

Central-Western (headquarters Emerald)—
E. J. Tannock (chairman and Government representative).
C. P. Copland (owners' representative).
J. P. Ryan (trappers' representative).

Northern Coast (headquarters Mackay)—
S. J. Monaghan (chairman and Government representative).
—— (owners' representative not yet decided).
C. G. Fallon (trappers' representative).

Northern (headquarters Townsville)—
W. R. Holmes (chairman and Government representative).
A. Shepherd (owners' representative).
A. H. Bauman (trappers' representative).

Peanut Board.

An additional clause has been added to the Order in Council constituting the present Peanut Board, providing that all peanuts shall be delivered to the Board in an unshelled condition.

A notice has been approved with regard to the further extension of the Peanut Board for a period of either three or five years as from the 1st July, 1927, the period to be decided by ballot which will be held in June, 1926. The Board will operate on the same conditions as the present Peanut Board, and growers who have harvested not less than one half-acre of peanuts during the preceding twelve months are invited to send their names and addresses at once to the Under Secretary, Department of Agriculture and Stock, Brisbane, so that their names may be placed on the roll of persons eligible to vote on the ballot when held.

State Insurance—Eight Years of Progress.

The Auditor-General has just completed an audit of the revenue account of the life department of the State Government Insurance Office up to 1st December, 1925. The Auditor's statement reveals the fact that the eight years' progressive march of the office is an indication that it has established itself in popular favour. The slogan of "Service Guaranteed and Satisfaction Assured" has caught on, and the undermentioned figures are the result.

Altogether 4,770 new policies were issued by the office for sums insured amounting to nearly one and a third million pounds. The receipts were a shade under a third of a million, exceeding 1924 figures by £40,000. The life assurance fund, which by this time is not far short of a million pounds, stands at £858,385, which is nearly £220,000 ahead of that of 31st December, 1924.

It is of interest that 84·9 per cent. of the premium income was added to the funds, and that the average rate of income from invested funds at the above date was £5 12s. 11d. per cent. The invested funds amount to £833,683 18s. 5d., leaving uninvested only £24,701 9s. 11d. or 2·87 per cent. of total life funds.

Details are as follows:—Funds at 31st December, £641,620 0s. 7d.; first year's premiums, £39,766 10s. 7d.; renewal premiums, £215,392 11s. 8d.; consideration of annuities, £24,161 5s.; interest, £38,160 0s. 2d.; miscellaneous, £2,468 10s. 7d.; total, £961,568 18s. 7d. Claims and bonuses, £17,075 10s. 10d.; surrenders and bonuses, £14,729 18s.; annuities, £19,911 17s. 3d.; commission and expenses, £50,244 7s.; duty and taxes, £1,221 17s. 2d.; assurance fund, 31st December, 1925, £858,385 8s. 4d.; total, £961,568 18s. 7d.

Italy's Growing Business with Australia.

According to the correspondent of the "Times Trade Supplement," at Milan, commercial relations between Italy and Australia are expanding. Figures published, covering the first eight months of 1925, indicate an increase of Italian purchases from Australia. For example, Italian fresh and frozen meat imports rose from 595 tons in the corresponding period of 1924 to 12,400 tons; wheat, from 11,740 tons to 40,645 tons; animal fats, from 1,116 tons to 4,893 tons; rough hides, from 1,739 tons to 2,698 tons.

In Italian exports to Australia during the same period of 1925 a similar growth is noticeable. Almond exports amounted to 519 tons, compared with 321 tons in 1924; automobiles, to 125 tons (this figure being slightly under that of 1924, but comparing favourably with 77 tons in 1923); liquorice root made a big leap, with 595 tons, compared with only 6½ tons in 1924, Australia, in fact, absorbing almost the whole of Italian exports of this article. The men's felt hat industry is also making great strides in its exports to the Commonwealth, the figures for the period under review exceeding by over 30 per cent. those of 1924.

How California Markets Its Citrus Fruits.

According to an announcement in the official organ of the Exchange, the Board of Directors of the California Fruitgrowers' Exchange has approved the Advertising Budget for the 1925-26 season. This Budget provides for the most complete advertising and sales promotion effort ever undertaken by the Exchange to increase consumer and trade preference for its products. The Budget, which is divided into three main groups—consumer advertising, trade work, and administration—involves an investment of 4½ cents per box on oranges and grape fruit, and 7 cents per box on lemons. This is the same rate as has applied during the past two years. Present budget estimates call for an investment of approximately $685,984 for oranges and grape fruit, and $353,855 on lemons.

Of the budget, 70.3 per cent. is allowed for consumer publicity work. For trade work, including sales promotion, 24.3 per cent. has been reserved. While 5.4 per cent. provides for administration.

The major part of the appropriation for consumer advertising is spent in magazines, newspapers, posters, and educational promotion work.

The "Sunkist" fruits will be advertised in magazines aggregating a circulation of 100,000,000. The newspaper campaign on oranges and lemons is also far-reaching, covering a total circulation of 566,000,000.

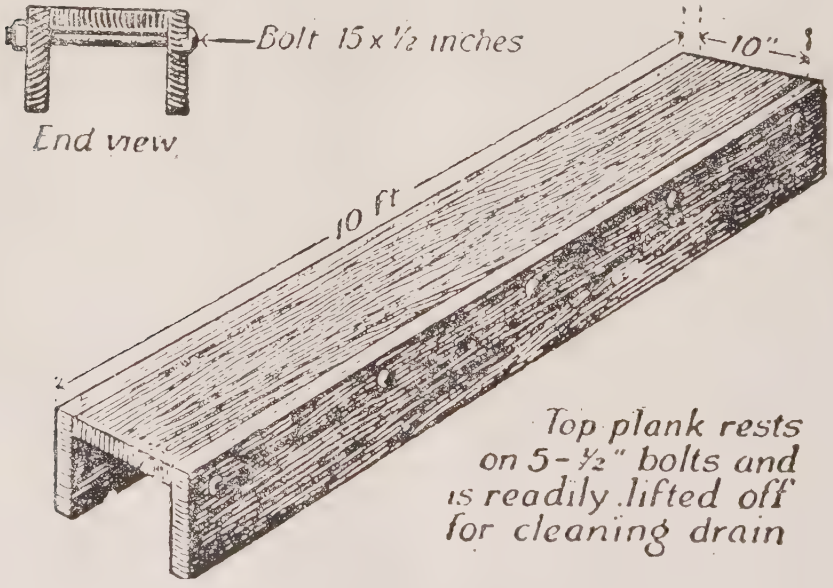
Educational promotion in the schools, hospitals, nurses, training schools, and with government extension workers will be intensified. The rising generation is to be well informed concerning California oranges—the fruit itself, together with the cultural, handling, and marketing operations.

Almost one-fourth of the year's budget is apportioned to help the trade stimulate sales. In the main office at Los Angeles a selected dealer list is kept, containing over 70,000 names of well-known merchants from all parts of America. To this list there are mailed each year informative literature and other data acquainting dealers with crop conditions and crop movements. In addition, sales and display suggestions are furnished. Dovetailing with this direct-by-mail service, nineteen dealer service men cover the United States and Canada to further better business and more scientific merchandising of perishables. These men have nothing to sell, but service. In doing this they meet and help over 40,000 dealers each year.

BOX CULVERTS.

A SUGGESTION FOR LOCAL AUTHORITIES.

A small box culvert with facilities for removing the top from time to time for cleaning out has been used with success in America. It is made of three planks ten feet long, two of them eight inches wide, and the other, which forms the top, ten inches wide. Five half-inch bolts, fifteen inches long, are placed through the side planks two inches from the top edges. Upon these bolts the top plank is set, as shown in the illustration.



SMALL PLANK CULVERTS THAT GIVE GOOD RESULTS.

Though the nuts are turned tight to prevent sagging and to insure unity and add strength, it is only necessary to dig down on the one side until the nuts are exposed. They are then loosened, and the top plank lifted out. The interior of the culvert is then easily cleaned with a spade.

Due to the fact that the wood is almost constantly damp, the threaded ends of the bolts should be treated with heavy oil, in order to prevent rusting.—"Country Gentleman."

Farm and Garden Notes for June.

Field.—Winter has set in and frosts will already have been experienced in some of the more exposed districts of the Maranoa and Darling Downs. Hence insect pests will to a great extent cease from troubling and weeds will alse be no serious drawback to cultivation. Wheat sowing should now be in full swing, and in connection with this important operation should be emphasised the necessity of at all times treating seed wheat by means of fungicides prior to sowing. Full directions for "pickling" wheat by the copper carbonate treatment are available on application to the Department of Agriculture, Brisbane. Land intended for the production of early summer crops may now receive its preliminary preparation, and every opportunity taken advantage of to conserve moisture in the form of rainfall where experienced; more particularly so where it is intended to plant potatoes or early maize. Where frosts are not to be feared the planting of potatoes may take place in mid-July; but August is the recognised month for this operation. Arrowroot will be nearly ready for digging, but we would not advise taking up the bulbs until the frosts of July have occurred. Take up sweet potatoes, yams, and ginger. Should there be a heavy crop, and consequently a glut in the market, sweet potatoes may be kept by storing them under cover and in a cool place in dry sand, taking care that they are thoroughly ripe before digging. The ripeness may be known by the milky juice of a broken tuber remaining white when dry. Should the juice turn dark, the potato is unripe, and will rot or dry up and shrivel in the sandpit. Before pitting, spread the tubers out in a dry barn or in the open, if the weather be fine. In pitting them or storing them in hills, lay them on a thick layer of sand; then pour dry sand over them till all the crevices are filled and a layer of sand is formed above them; then put down another layer of tubers, and repeat the process until the hill is of the requisite size, and finally cover with either straw or fresh hay. The sand excludes the air, and the potatoes will keep right through the winter. In tropical Queensland the bulk of the coffee crop should be off by the end of July. Yams may be unearthed. Sugar-cane cutting may be commenced. Keep the cultivator moving amongst the pineapples. Gather all ripe bananas.

Cotton crops are now fast approaching the final stage of harvesting. Growers are advised that all cotton in the Central District should be consigned to the Australian Cotton-growing Association, Rockhampton or Gladstone, whichever is nearest; whilst those in the Southern areas should consign their cotton to the Association at Whinstanes, near Brisbane. All bales and bags should be legibly branded with the owners' initials. In this matter the consignor is usually most careless, causing much delay and trouble in identifying parcels, which are requently received minus the address labels.

Kitchen Garden.—Cabbage, cauliflower, and lettuce may be planted out as they become large enough. Plant asparagus and rhubarb in well prepared beds in rows. In planting rhubarb it will probably be found more profitable to buy the crowns than to grow them from seed, and the same remark applies to asparagus.

Sow cabbage, red cabbage, peas, lettuce, broad beans, carrots, radish, turnip, beet, leeks, and herbs of various kinds, such as sage, thyme, mint, &c. Eschalots, if ready, may be transplanted; and in cool districts horse radish can be set out.

The earlier sowings of all root crops should now be ready to thin out, if this has not been already attended to.

Keep down the weeds among the growing crops by a free use of the hoe and cultivator.

The weather is generally dry at this time of the year, so the more thorough the cultivation the better for the crops.

Tomatoes intended to be planted out when the weather gets warmer may be sown towards the end of the month in a frame where the young plants will be protected from frost.

Flower Garden.—No time is now to be lost, for many kinds of plants need to be planted out early to have the opportunity of rooting and gathering strength in the cool, moist spring time to prepare them for the trial of heat they must endure later on. Do not put your labour on poor soil. Raise only the best varieties of plants in the garden; it costs no more to raise good varieties than poor ones. Prune closely all the hybrid perpetual roses; and tie up, without pruning, to trellis or stakes the climbing and tea-scented varieties, if not already done. These and other shrubs may still be planted. See where a new tree or shrub can be planted; get these in

position; then they will give you abundance of spring bloom. Renovate and make lawns, and plant all kinds of edging. Finish all pruning. Divide the roots of chrysanthemums, perennial phlox, and all other hardy clumps; and cuttings of all the summer bedding plants may be propagated.

Sow first lot, in small quantities, of hardy and half-hardy annuals, biennials, and perennials, some of which are better raised in boxes and transplanted into the open ground, but many of this class can, however, be successfully raised in the open if the weather is favourable. Antirrhinum, carnation, picotees, dianthus, hollyhock, larkspur, pansy, petunia, *Phlox Drummondi*, stocks, wallflower, and zinnias, &c., may be sown either in boxes or open beds. Mignonette is best sown where it is intended to remain. Dahlia roots may be taken up and placed in a shady situation out of doors. Plant bulbs such as anemones, ranunculus, freesias, snowflakes, ixias, watsonias, iris, narcissus, daffodils, &c. Tulips will not suit the Queensland climate.

To grow these plants successfully, it is only necessary to thoroughly dig the ground over to a depth of not less than 12 in., and incorporate with it a good dressing of well-decayed manure, which is most effectively done by a second digging; the surface should then be raked over smoothly, so as to remove all stones and clods, thus reducing it to a fine tilth. The seed can then be sown in lines or patches as desired, the greatest care being taken not to cover deeply; a covering of not more than three times the diameter of larger seeds, and a light sprinkling of fine soil over small seeds, being all that is necessary. A slight mulching of well-decayed manure and a watering with a fine-rosed can will complete the operation. If the weather prove favourable, the young seedlings will usually make their appearance in a week or ten days; thin out so as to leave each plant (if in the border) at least 4 to 6 in. apart.

Orchard Notes for June.

THE COASTAL DISTRICTS.

The remarks that have appeared in these notes for the past two months apply in a great measure to June as well, as the advice that has been given regarding the handling, grading, packing, and marketing of the citrus crop still holds good. As the weather gets cooler the losses due to the ravages of fruit flies decrease, as these insects cannot stand cold weather, and consequently there is only an odd one about. The absence of flies does not, however, permit of any relaxation in the care that must be taken with the fruit, even though there may be many less injured fruit, owing to the absence of fruit-fly puncture, as there is always a percentage of damaged fruit which is liable to speck, which must be picked out from all consignments before they are sent to the Southern States, if a satisfactory return is to be expected. If the weather is dry, citrus orchards must be kept in a good state of tilth, otherwise the trees may get a setback. Old worn-out trees can be dug out and burnt; be sure, however, to see that they *are* worn out, as many an old and apparently useless tree can be brought round and made to bear good crops, provided the trunk and main roots are still sound, even though the top of the tree is more or less dead. The whole of the top of the tree should be cut off and only the trunk and such sound main limbs left as are required to make a new head. The earth should be taken away from around the collar of the tree, and the main roots exposed, any dead roots being cut away and removed. The whole of the tree above ground and the main roots should then be dressed with a strong lime sulphur wash, or Bordeaux paste. The main roots should be exposed for some time, not opened up and filled in at once. Young orchards can be set out now, provided the ground is in good order. Don't make the mistake of planting the trees in improperly prepared land—it is far better to wait till the land is ready, and you can rest assured it will pay to do so in the long run.

When planting, see that the centre of the hole is slightly higher than the sides, so that the roots, when spread out, will have a downward, not an upward, tendency; set the tree at as nearly as possible the same depth as it was when growing in the nursery, cut off all broken or bruised roots, and spread those that remain evenly, and cover them with fine top soil. If the land is dry, the tree should then be given a good watering, and when the water has soaked in, the hole can be filled up with dry soil. This is far better than watering the tree after the soil has been placed round it and the hole filled up. Custard apples will be ripening more slowly as the nights get colder, and if the weather becomes unduly cold, or if immature fruit is sent South, the fruit is apt to turn black and be of no value. This can easily be overcome by subjecting the fruit to artificial heat, as is done in the case of bananas

during the cooler part of the year, when it will ripen up properly and develop its flavour. Grade custard apples carefully, and pack in cases holding a single layer of fruit only for the Southern markets.

Pineapples, when at all likely to be injured by frost, should be protected by a thin covering of bush hay, or similar material. The plantation should be kept well worked and free from weeds, and slow-acting manure, such as bone dust or island phosphates, can be applied now. Lime can also be applied when necessary. The fruit takes longer to mature at this time of the year, consequently it can be allowed to remain on the plant till partly coloured before gathering for the Southern markets, or can be fully coloured for local use.

Banana plantations must be kept worked and free from weeds, especially if the weather is dry, as a severe check to the plants now means small fruit later on. Bananas should be allowed to become full before the fruit is cut, as they will carry all right at this time of the year; in fact, there is more danger of their being injured by cold when passing through New England by train than there is of their ripening up too quickly.

Bear in mind the advice given with regard to the handling, grading, and packing of the fruit. It will pay you to do so. Land intended for planting with bananas or pineapples during the spring should be got ready now.

Strawberries require constant attention, and unless there is a regular and abundant rainfall they should be watered regularly. In fact, in normal seasons, an adequate supply of water is essential, as the plants soon suffer from dry weather, or strong, cold westerly winds. Where not already done, vineyards should be cleaned up ready for pruning—it is, however, too early to prune or to plant out new vineyards.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

All kinds of deciduous fruit trees are now ready for pruning, and this is the principal work of the month in the orchards of the Granite Belt Area. Don't be frightened to thin out young trees properly, or to cut back hard—many good trees are ruined by insufficient or bad pruning during the first three years. If you do not know how to prune, do not touch your trees, but get practical advice and instructions from one or other of the Departmental officers stationed in the district. In old orchards do not have too much bearing wood; cut out severely, especially in the case of peaches, or you are likely to get a quantity of small unsaleable fruit. There are far too many useless and unprofitable fruit trees in the Granite Belt Area which are nothing more or less than breeding-grounds for pests, such as fruit fly, and are a menace to the district. Now is the time to get rid of them. If such trees are old and worn out, take them out and burn them, but if they are still vigorous, cut all the tops off and work them over with better varieties in the coming season—apples by grafting in spring and peaches and other stone fruits by budding on to young growth in summer. Planting can start now, where the land is ready and the trees are to hand, as early planted trees become well established before spring and thus get a good start. Be very careful what you plant. Stock to varieties of proved merit, and few at that, and give so-called novelties and inferior sorts a wide berth. Take the advice of old growers, and do not waste time experimenting with sorts that have probably been tested in the district and turned down years ago. When land is intended for planting this season, see that it is well prepared and well sweetened before the trees are put in, as young trees seldom make a good start when planted in sour and bodly prepared land.

Slowly acting manures—such as bonedust, meatworks manure, or island phosphates—can be applied now, as they are not liable to be washed out of the soil, and they will be available for the use of the trees when they start growth in spring. Lime can also be applied where required. Badly drained land should be attended to, as no fruit trees will thrive with stagnant water lying round their roots.

On the Downs and Tableland all kinds of fruit trees can be pruned now, and vines can be pruned also in any district where there is no danger from late frosts, and where this can be done the prunings should be gathered and burnt and the vineyard ploughed up and well worked to reduce the soil to a good state of tilth, so that should rain come it will absorb all that falls and the moisture can be kept in the soil by cultivation subsequently.

Citrus fruits will be at their best in the Western districts. The trees should be watered if they show signs of distress, otherwise all that is necessary is to keep the surface of the land well worked. All main-crop lemons should be cut by this time, as if allowed to remain longer on the tree they only become overgrown and are more suitable for the manufacture of peel, whereas if cut and cased now they will keep in good order so that they can be used during the hot weather.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S., AND A. K. CHAPMAN.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

1926.	MAY.		JUNE.		MOONRISE. MAY.	MOONRISE. JUNE.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					p.m.	p.m.
1	6·20	5·18	6 38	5·2	7·58	9·50
2	6 21	5 17	6 38	5·2	8·52	10 55
3	6 21	5 17	6 38	5·1	9·50	11·57
4	6·22	5 16	6 39	5 1	10·53	nil
						a.m.
5	6 22	5·16	6 39	5 1	11·58	1·0
6	6 23	5 15	6·39	5·1	nil	2·1
					a.m.	
7	6 23	5·15	6·40	5·1	1·2	3 2
8	6 24	5 14	6 40	5·1	2 5	4 3
9	6 24	5·13	6 41	5·1	3·8	5 2
10	6 25	5·12	6·41	5·1	4 11	6·1
11	6·25	5·11	6·41	5·1	5·12	6·58
12	6·26	5·11	6·42	5·1	6 12	7 54
13	6·26	5·10	6·42	5·1	7·13	8·45
14	6 27	5 10	6·43	5·1	8·14	9 32
15	6·27	5·9	6·43	5·1	9 11	10·14
16	6·28	5·9	6·43	5 1	10 4	10 53
17	6·29	5·8	6·44	5·1	10·54	11·28
						p.m.
18	6 30	5·7	6 44	5·2	11 39	12·2
					p.m.	
19	6 31	5·6	6 44	5·2	12·18	12·33
20	6·32	5 6	6·44	5 2	12·54	1·6
21	6·32	5 5	6·44	5 2	1·30	1·39
22	6 33	5 5	6 44	5 3	2·2	2·16
23	6·33	5·5	6·44	5 3	2 36	2·56
24	6·34	5 4	6·45	5 3	3·7	3 41
25	6·34	5 4	6·45	5·3	3·43	4 30
26	6 35	5·3	6·45	5 4	4·21	5·29
27	6·35	5·3	6·45	5 4	5·4	6·31
28	6 36	5·3	6·45	5·4	6·0	7·38
29	6·36	5·2	6·45	5·5	6·44	8·45
30	6·37	5·2	6·45	5·5	7·42	9·50
31	6·38	5·2	...	...	8·46	...

Phases of the Moon, Occultations, &c.

The times stated are for Queensland, New South Wales, Victoria, and Tasmania.

5 May	☾	Last Quarter	1	13 p.m.
12 ,,	●	New Moon	8	55 a.m.
20 ,,	☽	First Quarter	3	48 a.m.
27 ,,	○	Full Moon	9	49 p.m.

Perigee, 7th May, at 3 42 p.m.
Apogee, 20th May, at 3 48 a.m.

An occultation of the star Delta Capricorni will occur at an early hour on the 10th May when the Moon will be not far from the eastern horizon in a crescent shape tilted up, with the horns somewhat toward the right. The star will disappear behind the bright edge of the Moon about 3·20 a.m., and reappear about 50 minutes later on the dark edge of the Moon. A pair of binoculars or small telescope should make this an interesting spectacle.

The big planet Uranus will appear as a tiny star just below the much more brilliant Venus before sunrise on the 5th; binoculars will be required to see Uranus. The ringed planet Saturn will be in opposition to the Sun on the 14th and, rising about sunset, will be a beautiful object for observation in a telescope during the early hours of the evening.

About 9 p.m. on the 26th a conjunction of the planets Saturn with the Moon will occur when they are high up in the N.N.E. in the direction of Libra with the Scorpion on the right.

3 June	☾	Last Quarter	6	9 p.m.
10 ,,	●	New Moon	8	8 p.m.
18 ,,	☽	First Quarter	9	14 p.m.
26 ,,	○	Full Moon	7	13 a.m.

Perigee, 1st June, at 4 24 p.m.
Apogee, 16th June, at 10 18 p.m.
Perigee, 28th June, at 7 48 p.m.

About one hour before sunrise on the 2nd the star Gamma Capricorni will disappear behind the eastern edge of the Moon; it will not reappear until about the time of sunrise when it will be less observable. Mercury will be invisible in the early part of June being in superior conjunction with the Sun on the 5th, but towards the end of the month it will be visible somewhat indistinctly low down in the west about an hour after sunset.

On the 22nd at 2·30 p.m. the Sun will arrive at its greatest northern declination and the solstice will occur; the sun having reached its greatest northern declination, will pause and turn to come southward again. Saturn will be in conjunction with the Moon on the 22nd at 3 a.m., when Saturn will appear the uppermost at a distance of about four times the diameter of the Moon to the south. On the night of the 26th about 12·15 a.m., Omicron Sagittarii will disappear behind the lower eastern edge of the Moon and will reappear on the lower western edge about 12·30 a.m. Jupiter will be in conjunction with the Moon on the 29th at 9·39 p.m., when the planet will be about five times the diameter of the Moon to the left of it.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

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